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ABSTRACT

A study was designed to determine if students' insights about the strategies they used to study and understand an expository passage were similar to basic types of comprehension skills developed in many reading programs. In addition, it examined (1) whether good and poor readers differed in the types of strategies they used, and (2) whether students' reports could be used to discriminate between students on a recall comprehension test and to predict their classification as masters or nonmasters of comprehension skills as measured by standardized tests. An intraspective interview procedure was used in which 44 seventh grade students (22 good and 22 poor readers) silently read a normal or a disrupted version of an expository passage, stopping after each paragraph to answer questions about the strategies they were using to study and understand the paragraph. A recall test was administered immediately after the reading and a set of standardized tests was given a week later. Analyses indicated that students' insights into their reading/study behavior were similar to traditional types of comprehension skills. Good and poor readers differed not in the kinds of strategies they used, but in the frequency with which they reported using them. Analyses also indicated that the responses could be used to discriminate between students on a recall test and to predict their classification on tests of comprehension skill.
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Technical Report No. 566

IDENTIFICATION OF SEVENTH-GRADE STUDENTS' INSIGHTS ABOUT
THE STRATEGIES THEY USED TO STUDY AND UNDERSTAND
AN EXPOSITORY TEXT

by

Kaybeth Camperell

Report from the Project on
Studies in Language: Reading and Communication

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IDENTIFICATION OF SEVENTH-GRADE STUDENTS' INSIGHTS ABOUT
THE STRATEGIES THEY USED TO STUDY AND UNDERSTAND
AN EXPOSITORY TEXT

Kaybeth Camperell

Under the supervision of Professor Wayne Otto

Abstract

The major purpose of this study was to determine if students' insights about the strategies they used to study and understand an expository passage were similar to basic types of comprehension skills developed in many instructional reading programs. Secondary purposes of the study involved determining if (1) good and poor readers differed in the types of strategies they said they used, and (2) students' verbal reports were reliable in the sense that they could be used to discriminate between students on a recall test or comprehension and to predict students' classification as Masters of Non-masters of a set of criterion-referenced tests of comprehension skill development.

A stratified random sample of forty-four seventh-grade students participated in the study. Twenty-two of the students were classified as good readers, and twenty-two of the students were classified as poor readers. The students read a normal or a disrupted version of an expository passage about a desert environment.

An introspective interview procedure was used in which students read the passage silently, stopping at the end of each paragraph to answer a general, open-ended question and a set of standard probe

questions about the strategies they used to study and understand the paragraph. A probed-recall test was administered when students finished reading the passage, and a set of criterion-referenced tests was administered a week following the completion of the interviews.

Eleven categories of reading-study behavior were identified in the student protocols that indicated students talked about using five strategies similar to traditional types of comprehension skills and two strategies similar to traditional types of study skills.

The Kruskal-Wallis model of analysis of variance by ranks was used to analyze the categorized data to determine if good and poor readers who read the normal or disrupted version of the text differed in the frequency with which they said they used reading-study strategies. Among the eleven sets of comparisons performed, only four statistically significant differences were obtained. Good readers who read the disrupted version of the passage talked about using context (Category One) and about grouping related ideas in paragraphs (Category Three) more often than poor readers who read the disrupted version of the passage. Good readers in both text conditions talked about identifying the topic of paragraphs and predicting the topic of paragraphs (Category Two) more often than poor readers. And students who read the normal version of the passage talked about relating information in the passage to prior knowledge and experience (Category Four) more often than students who read the disrupted version of the text.

Results of an analysis of covariance test indicated that students' verbal reports could be used to discriminate between groups of students on a recall measure of comprehension. Students who said they used

80 per cent of the students were classified accurately as Masters or Non-masters of a set of criterion-referenced tests based on the frequency with which they talked about using certain strategies.

The major conclusion from the study was that students' insights about their reading-study behavior are similar to traditional types of comprehension skills. Although good and poor readers were not found to differ in the kinds of strategies they said they used, they did differ in the frequency with which they said they used some of the strategies identified. Further analysis of the student responses indicated that their verbal reports could be used to (1) discriminate between students on a probed-recall test, and (2) predict students' classification as Masters or Non-masters of comprehension skills, as measured by a set of criterion-referenced tests.

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INTRODUCTION

Examination of reading methods texts and teachers' guides to instructional reading materials indicates that most reading educators advocate some form of comprehension skill instruction (Johnson & Barrett, in press; Mason, et al, 1977). A primary goal of instruction in reading comprehension is to help students develop independence in acquiring and using information from printed materials. Instruction in basic comprehension skills is supposed to provide students with a set of generalizable skills that can be adapted into strategies for reading and learning from texts in all subject-matter areas (Otto, et al, 1974). Most of the skills listed in various instructional materials and reading methods texts, however, are derived from traditional teaching practices and conventional wisdom rather than from the results of empirical research.

Despite the widely held view among reading educators that students should be taught certain basic comprehension skills, Strang (1962) and Wolf and Tymitz (1976-77) have questioned whether or not any type of comprehension skill instruction actually influences the strategies students use to read and learn from texts. As noted by Strang (1962), "lacking...basic knowledge of the reading process, we have built up a superstructure of teaching methods which may be highly inappropriate and inefficient for many pupils (p. 188)."

Strang's criticism reflects a persistent problem for reading educators in that, until recently, researchers in psychology and

education had failed to study or identify the mental processes underlying reading comprehension (Bormuth, 1969; Jenkinson, 1969; Simon, 1971; Carroll, 1971). A frequently noted reason for this failure is that most of the researchers investigating comprehension processes prior to the 1970's relied on test scores, or the products of comprehension, to characterize skills and cognitive processes underlying comprehension performance. Currently, several cognitive psychologists (Kintsch & van Dijk, 1978; Fredericksen, 1979; Rumelhart, in press) have developed and are attempting to validate new theories and models of comprehension. However, these models are still new and the results of research related to the models should be considered tentative (Kintsch, 1978, 1979). Furthermore, the relationship between covert cognitive processes such as those involved in understanding prose materials and the strategies students use or can be taught to use is still unknown. Thus, instead of trying to infer reading skills or strategies from theoretical models of comprehension processes, a more direct way to determine if students use traditional types of comprehension skills to read and learn from texts may be simply to ask students how they go about trying to study and understand textual materials.

Researchers in experimental and educational psychology have begun only recently to accept subjects' self-reports or introspective responses as evidence of cognitive performance. Current interest in using self-report information stems from notions related to

metacognitive development (Flavell, 1976). The term metacognition refers to types of introspective knowledge and insight students have about their own problem-solving abilities and to ways students use such knowledge to monitor, modify, and control their own learning and comprehension efforts (Baker & Brown, in press). Brown (in press) has specifically characterized metacognitive forms of knowledge underlying skilled reading performance as the types of skills typically referred to by reading educators as reading-study skills. A basic assumption shared by researchers interested in metacognitive development (Brown & DeLoache, 1978) is that students acquire insights and introspective knowledge about themselves as learners, insights about strategies for solving problems, and insights about how various problem-solving tasks differ before they develop the ability to monitor and control their own reading-study efforts. Moreover, researchers assume that if students have such personal knowledge or insight, they should be able to reflect on it and to discuss the knowledge or insights they have with others (Baker & Brown, in press). Although the results of some studies have shown that students can talk about the strategies they use to understand prose materials (Olshavsky, 1975), few studies have been reported which demonstrate that students' ability to talk about the strategies they use to understand and study prose materials is related either to their ability to remember information after reading or to other measures of reading comprehension performance.

The study reported here was designed to determine if students' insights about the strategies they used to understand and study an expository passage were related to the types of skills developed in many instructional reading programs and to other measures of comprehension performance. That is, the purpose of the study was to identify the strategies students said they used to comprehend and study an expository passage and to relate the strategies students said they used to types of skills commonly taught in elementary school reading programs and to recall tests and criterion-referenced tests of comprehension skill development.

The researcher interviewed forty-four seventh-grade students to identify the types of strategies students said they used to study and understand an expository passage. As students read the passage, they were asked to stop at the end of each paragraph to describe what they did to study and understand the paragraph. Twenty-two of the students read a version of the passage in which the logical or temporal structure of the paragraphs had been disrupted in certain ways, and twenty-two other students read a version of the passage in which the logical or temporal structure of the paragraphs was not disrupted. The students' responses were then analyzed by the researcher to (1) identify the types of statements students made about their reading-study behavior when asked to read the normal or the disrupted version of the passage and (2) determine if the students' responses could be classified into categories of behaviors similar

to the types of skills developed in many instructional reading programs. Once all of the responses had been classified into reading-study skill categories, the categories of responses were then analyzed to determine if (1) students classified as good and poor readers differed in the frequency with which they reported using instances of strategies within the categories, (2) students who frequently reported using reading-study strategies recalled more information than students who did not frequently report using reading-study strategies, and (3) student responses could be used to predict mastery or non-mastery, as measured by criterion-referenced tests of comprehension skill development, of a set of comprehension skills.

CHAPTER I

REVIEW OF RELATED LITERATURE

In this section three areas of literature that relate to identifying the strategies students use to understand prose materials are reviewed: (1) product-oriented and process-oriented research studies designed specifically to identify the skills underlying reading comprehension performance; (2) literature related to the construct of metacognition and research related to using this construct as a theoretical framework for investigating students' insights about their reading-study strategies; and (3) research related to the use of free-recall tests and criterion-referenced tests of comprehension skill development as dependent variables in the study reported here. The results of the research are then summarized, and the implications of the research for the present study are discussed.

RESEARCH CONDUCTED TO IDENTIFY READING SKILLS

Researchers tend to take either a product-oriented or a process-oriented research approach to identify the skills underlying reading comprehension ability. Product-oriented research studies are designed to identify the skills involved in reading comprehension by analyzing students' responses to items on tests of comprehension ability.

Process-oriented research studies, on the other hand, are designed to

identify comprehension skills or strategies by analyzing students' descriptions of how they went about trying to understand a passage or how they figured out the answers to questions about information in passages they read.

Product-Oriented Research

Much of the empirical support for teaching specific comprehension skills is derived from three types of product-oriented research: (1) studies in which students' errors in comprehending paragraphs or studying content-area materials were analyzed, (2) studies in which the relationship between tests of general reading achievement and achievement on specific content-area tests was examined, and (3) factor analytic studies in which attempts were made to isolate and identify the specific subskills of reading comprehension.

Analysis of Student Errors. Thorndike (1917) analyzed students' mistakes in answering questions over short paragraphs, and Dewey (1935) analyzed students' errors in answers to questions about a passage from a history textbook and their answers to different types of test questions. McCallister (1930) analyzed the errors students made in completing various assignments in three different content-area classrooms. Results of Thorndike's study have been used repeatedly as evidence that reading comprehension involves the same mental activities as thinking in general (Otto, 1977; Pearson & Johnson, 1978). Dewey's results and conclusion essentially paralleled those of Thorndike, except Dewey also found that

students without prior knowledge of events in American history had more trouble understanding selections from history textbooks than students who had the appropriate background knowledge. McCallister's (1930) study was one of the first studies in which a researcher found that students might be able to comprehend and study narrative materials but they still had difficulty understanding and studying content-area materials. Even though these early studies addressed aspects that are still important issues in reading education today, the results and conclusions of these studies are difficult to evaluate. The published reports are sketchy; and if the researchers reported any data to support their conclusions, the information provided was simply a descriptive summary of the researchers' results. A more serious criticism of these studies, however, is that the researchers used students' errors in comprehending as a basis for inferring the processes or strategies involved in skilled or accurate comprehension performance (Fareed, 1971; Simon, 1971).

Correlation Studies. Researchers have examined the relationship between achievement on tests of general reading ability and achievement on specific subject-matter tests (Shores, 1943; Fay, 1950; Maney, 1958; Sochor, 1958; Artley, 1968). In general the results of these studies have been interpreted to suggest that although many reading skills, as measured by tests of reading achievement, are common to most content areas, some particular skills and patterns of skills are more highly correlated with academic success in certain content

areas than in others. Correlations, however, do not demonstrate causation; thus, the results of these studies fail to show that the skills students use to comprehend material on tests of reading and subject-matter achievement are the same skills students use to comprehend classroom textual materials.

Factor Analytic Studies. Factor analytic studies are designed to statistically isolate and identify the subskills of reading comprehension, and many reading authorities have cited the results of factor analytic research as support for teaching specific subskills (Chester, 1972). Results of these studies, however, are highly conflicting and most reviewers have concluded that this research approach is inappropriate for identifying distinct and independent reading comprehension skills (Gray, 1958; Strang, 1962; Mason, et al, 1977). Moreover, little research can be found to support teaching the skills identified through factor analysis even though the authors and critics of these studies suggest that such research is needed to examine the effects of teaching specific skills on student performance (Strang, 1962; Davis, 1972; Mason, et al, 1977).

Process-Oriented Research

Although there has not been a concerted effort in the past to use process-oriented research techniques, some researchers have used introspective-retrospective interview procedures either to identify the mental processes of comprehension or to identify the skills and

strategies students use to comprehend and study different types of texts (Harker, 1974). The terms introspection and retrospection are often used interchangeably in the literature; however, introspective approaches usually differ from retrospective approaches in the amount of material a student is required to read before responding and the amount of delay that occurs between the initial reading of a unit of text and the students' responses or reports. Introspective interview techniques require students to describe the strategies or processes they used to understand a unit of information in a text with a minimum of delay between reading and reporting how the material was comprehended. Retrospective techniques typically introduce a greater delay between students' responses and their initial reading of a text as well as requiring students to describe the strategies they used to comprehend longer segments of text.

Research Conducted to Identify the Mental Processes of Comprehension. Many of the introspective-retrospective studies in reading were conducted in reaction to factor analytic or other product-oriented research techniques because the investigators of the introspective-retrospective studies did not believe that the processes of comprehension could be inferred from test scores, or the products of comprehension (Strang, 1962). Thus, introspective-retrospective approaches were employed to try to identify the underlying mental processes of comprehension by having students describe the processes they used to comprehend printed material and to answer questions about the material they read (Swaim, 1953; Jenkinson, 1969; Fareed, 1971). The

researchers then tried to infer the basic cognitive processes of comprehension from the students' responses.

Huey (1901), Ames (1966), and Quealy (1969) used retrospective techniques to study how readers use contextual information to determine the meanings of words. Jenkinson (1969) analyzed students' retrospective responses to identify the language clues they used to complete cloze passages, and Jacobson (1973) used a retrospective approach to study the reasoning processes students used to answer objective questions on tests of reading comprehension. Many of the researchers have reported students' "interpretive" responses to short stories (Piekarz, 1958; Squire, 1964; Strang & Rogers, 1965; Ring, 1963; Dollerup, 1971), and some researchers have reported students' interpretive responses to expository material. Swain (1953) analyzed the introspective responses of college students to identify the thought processes they used to answer questions over both narrative and expository materials, and Fareed (1971) compared the retrospective responses of sixth-grade good readers asked to read two expository passage, one a science text and the other a history text.

The procedure followed in most of the introspective-retrospective studies required students to read an experimental passage silently prior to describing the processes they used to understand the selection. Following the silent reading, students were given paragraphs from the passage typed on individual cards. Students reread the passage from the cards orally, stopping to describe the

processes they used to understand each paragraph of the text. Sometimes students were asked to summarize what they read or to answer questions over what they read prior to orally re-reading the passages. Researchers classified responses into either pre-established categories or categories established after all the responses had been analyzed.

Overall, the results of these studies have been interpreted as showing that good readers are better than poor readers in their ability to: (1) analyze language, (2) reconstruct the meaning of prose passages, (3) describe the processes they used to understand texts, (4) adapt their reading behavior to different purposes for reading and different types of reading material, and (5) distinguish personal ideas and experiences from those expressed by the author of a text (Gray, 1958; Strang, 1962; Harker, 1974).

Critics, however, question the validity of the findings and conclusions of these studies. In most of the introspective-retrospective studies conducted for the purpose of identifying the underlying mental processes of comprehension, a delay was introduced between the students' description of the processes they used and the actual processing that occurred during reading or answering questions. This delay required the students to remember the processes they had used rather than to describe the processes as they occurred which makes reliable information difficult to obtain (Olshavsky, 1975). Moreover, the relationship between a subjects' description of a mental process and the actual process is simply not known (Simon, 1971). Given the

speed of on-going mental events, it is highly questionable that people can, in fact, introspect about cognitive processes that occur during reading comprehension (Nisbett & Wilson, 1977).

Research Conducted to Identify Reading-Study Strategies.

Instead of trying to identify underlying cognitive processes, some researchers adopted an introspective-retrospective approach to investigate how students applied various reading-study skills or to identify differences among the strategies used by good and poor readers. These studies were conducted to determine (1) differences among good and poor readers in their ability to read for different purposes, (2) the strategies used by good and poor readers to understand narrative materials, and (3) the strategies or skills used by students at various ages when asked to read for study purposes.

Reading for Different Purposes. Smith (1967) conducted a retrospective interview study in which she analyzed the responses of good and poor twelfth-grade readers asked to read for two different purposes. The students were asked to read a biographical passage about circus entertainers either for the purpose of reading for details or reading for general impressions (i.e., gist understanding).

Four types of data were collected: (1) product responses which consisted of answers to detail and general impression questions over the passage; (2) process responses about how the students determined the answer to each question; (3) process responses about how the students read for the two purposes they were given for reading; and

(4) process responses about the students' past experiences in reading for different purposes. The data were analyzed both quantitatively and qualitatively.

Results of Chi square tests and analysis of covariance tests indicated that the good and poor readers read for both purposes with equal success; however, good readers were more successful than poor readers in answering detail questions when their purpose was to read for general impressions. Even though quantitative analysis of the data indicated that few differences existed between good and poor readers' ability to answer questions about the passage they read, qualitative analysis of the students' responses about the procedures or strategies they used to read for different purposes revealed important differences. The quality of the good readers' responses to the questions they answered and their descriptions of the procedures they used to read for both purposes was superior to the responses of poor readers.

Smith interpreted these results as suggesting that good readers adjusted their reading behavior according to the purposes they were given for reading, and they seemed more certain about the procedures they used to read for different purposes. Poor readers, on the other hand, were unable to differentiate between the procedures they used to read for different purposes. Smith concluded that the inferior quality of poor readers' answers to questions and their descriptions of the procedures they used to read for different purposes reflected the poor readers' lack of insight about or awareness of their own

reading process.

Reading Short Stories. Critical of the procedures used in previous introspective-retrospective research because of the delay introduced between subjects' reading a passage and describing the strategies they used to understand the passage, Olshavsky (1975) used a modified form of protocol analysis (see Newell & Simon, 1972) to identify the comprehension strategies of tenth-grade good and poor readers asked to read short stories. Students participating in Olshavsky's study read short stories which had red dots placed after every independent clause. At each dot, the students stopped reading and described what they had been doing and thinking as they read. Although Olshavsky conceded that this procedure still introduced some delay between students' reading and describing the strategies they used to comprehend, she adopted the procedure of stopping students after every independent clause in order to minimize the delay between students' reading a unit of text and their descriptions of what they said they did to understand each unit of the text.

Olshavsky analyzed students' protocols to establish the categories into which she classified their responses; thus, her classification system was derived from an analysis of the student responses rather than from a predetermined list of reading skills. The categories of responses she identified consisted of three word-meaning strategies (e.g., use of context), six sentence-comprehension comprehension strategies (e.g., inference), and one strategy which related to understanding the stories as a whole (e.g., use of

information about the story).

Olshavsky predicted that the strategies used by good and poor readers would differ, that students who were interested in the content of the stories would report more strategies than students who were not interested in the content of the stories, and that students would report using more strategies when they read abstract material than when they read concrete materials. In later statistical analyses of the types of responses reported by good and poor readers, Olshavsky (1976-1977) was unable to find support for her predictions. She did find that good and poor readers differed in the overall frequency with which they reported using strategies; however, no statistically significant differences were obtained between the types of strategies good and poor readers said they used within any of the experimental conditions. Olshavsky concluded that both good and poor readers appeared to use similar strategies to comprehend short stories, but that they differed in the frequency with which they applied the types of strategies she identified.

In a second study using the same procedures, Olshavsky (1978) tried to identify differences between the strategies reported by good and poor readers asked to read increasingly difficult short stories. Her results indicated that, for both good and poor readers, as the difficulty of the material increased, the number of strategies they said they used decreased. Olshavsky interpreted this finding as suggesting that students will not apply or be able to describe the

strategies they use to comprehend stories if the stories are too difficult for the students to understand. Hence, passages too difficult for students to comprehend may result in fewer responses than passages that are closer to the students' instructional reading levels.

Reading for Study Purposes. Two studies were identified in which investigators attempted to determine how students read for study purposes. One study (Robinson, 1965) was conducted to determine how students applied traditional types of reading skills when asked to read for study purposes. The other study (Smirnov, 1973) was a developmental study conducted in the Soviet Union to determine differences among the strategies used by young students and adults asked to read for different study purposes.

Robinson (1965) interviewed students to determine how they applied reading skills when asked to solve a social studies problem. The purpose of this study was to determine if the skills listed by reading authorities as those needed to read social studies materials were the skills students actually used when reading to solve a social studies problem. Robinson's study was an exploratory study in which he combined an introspective interview technique with observations of the students' reading-study behavior.

Twelve, fourth-grade students participated in the study, and each student was interviewed on an individual basis. The students were asked to solve a social studies problem created by their classroom teacher by reading various reference books, textbooks, and trade books. The students were observed as they worked to create a rough draft of

a report which would answer the problem they had been given. As they worked, they were asked to tell the examiner what they were thinking or why they were doing certain things. The student responses and study behaviors were recorded and later analyzed by Robinson to identify the major categories into which individual responses were classified. The major categories he identified were similar to such traditional reading skill behaviors as identifying main ideas and drawing conclusions. After all of the interview protocols were analyzed, Robinson compared the skills he identified to the skills listed by various reading authorities.

Two judges independently classified the students' behaviors and responses according to the classification system developed by Robinson, and a .93 inter-rater reliability coefficient was obtained between Robinson's classification of the student responses and that of the two judges. Therefore, Robinson concluded that the behaviors and verbal responses of students as young as most fourth-graders could be classified reliably into categories of typical reading skill behaviors such as those listed by various reading authorities.

The data reported by Robinson were not tested for statistical significance due to the small sample size and the exploratory nature of his study. The descriptive data reported indicated that of the eight reading skills identified by Robinson, approximately half of the students were able to use six of the skills successfully. However, less than half of the students successfully used the seven reference

skills that were observed. Robinson interpreted these findings as reflecting either the students' lack of maturity in reading or their lack of experience in solving social studies problems independently. Despite many of the students' failure to apply all of the skills successfully, Robinson concluded that the results of his study demonstrated that an introspective interview procedure combined with observation of student behavior could be used as an effective means of identifying reading skills

Smirnov (1973) reported the results of a series of retrospective studies conducted in the Soviet Union during the 1940's. In these studies, adults and children were asked to describe the strategies they used to read and study texts, and the purpose of the studies was to determine how older and younger subjects read different types of material when given different purposes for reading.

Analysis of the adults' responses indicated that the strategies reported by adults appeared to be more conscious and deliberate when their purpose for reading was to remember compared to when their purpose was simply to read to understand. Given different purposes for reading, adults said they varied their strategies according to the type of test they anticipated. Reading for the purpose of answering questions seemed to produce fewer conscious attempts to understand and remember than reading to be able to recount or retell what was read. Adults also said they varied the strategies they used according to the type of material (descriptive, explanatory, or

narrative texts) they read, the specific content of the material, and the ideational density of the material. From these results, Smirnov (1973) concluded that a mnemonic, or remembering, orientation made the adults' awareness of their strategies "more frequent, distinct, conscious, and intentional (p. 148)."

Further descriptions by Smirnov of the adults' responses indicated that adults could explain how they grouped a text into thought units, how they identified meaningful points in a text, and how they noticed transitions between ideas or thought units in a text. The strategies described by the subjects participating in these studies closely resemble the traditional reading skills of finding main ideas and using the organizational structure of a passage to aid in comprehending and remembering information from texts.

When children were given comparable tasks, distinct developmental differences were observed between the reading behavior of children and that of adults. Smirnov (1973) lists fourteen specific ways in which children's reading-study behavior differed from the reading-study behavior of adults, but only two are directly relevant to this review.

First, analysis of the children's recall protocols indicated that they grouped the texts into meaningful units and that this grouping was influenced by the organizational structure of the texts they read. However, when questioned, most students below the sixth-grade level expressed almost total unawareness of grouping the texts into units during reading. Smirnov interpreted this finding as showing that

what seems to distinguish mature readers from immature readers is the ability of older students to consciously control their own attempts to understand and remember information from texts.

The second important finding reported by Smirnov concerns the verbal reports of young students compared to the verbal reports of the sixth-grade students participating in these studies. Although young school children's reading behavior varied greatly from that of adults, by sixth-grade students could (1) describe the strategies they used to study homework assignments, (2) explain the difference between organized and disorganized texts, and (3) divide texts into groups of ideas for deliberate study purposes.

Summary of Research Conducted to Identify Reading Skills

Much of the support for the common practice of teaching specific comprehension skills is derived from the results of product-oriented research studies. The results of most of these studies, however, provide only indirect evidence that the skills taught in elementary school reading programs are the same types of skills students use to understand and study classroom reading materials. From the research reviewed, it appears that many reading authorities question the results of product-oriented research studies in that the products or outcomes of comprehension were used to infer the processes or skills underlying comprehension performance.

Other researchers conducted studies to identify the skills or processes students used to comprehend prose materials using

introspective-retrospective interview techniques. Many of these studies were conducted to identify the mental processes underlying comprehension, and the results of these studies are also questionable; there is little evidence to support the notion that people can describe the actual cognitive processes that occur in their minds as they read and study prose materials.

Some researchers, however, used introspective-retrospective interview procedures to identify how students went about trying to understand or study printed materials. These researchers were not attempting to identify the cognitive processes underlying comprehension performance. Instead, they were trying to determine what types of skills or strategies various groups of students said they used when asked to read different kinds of texts or when asked to read for different purposes.

Results of studies conducted by Robinson (1965), Smith (1967), and Olshavsky (1975) suggest that students can talk about their reading-study behaviors and that students' verbal reports about their reading-study behaviors can be classified reliably into categories of behaviors similar to traditional types of reading comprehension skills. Results of studies conducted by Smith (1967) and Olshavsky (1975) also indicate that good and poor readers, when asked to read narrative passages, may not differ in the kinds of strategies they say they use to comprehend and study short stories or biographies, but they do differ in the frequency with which they say they apply

strategies or in their awareness of the strategies they used.

Results of retrospective interview studies conducted in the Soviet Union seem to support many of the findings and conclusions of American researchers who have used introspective-retrospective interview techniques to identify students' reading-study strategies. Moreover, from the results of the Soviet research reviewed, it can be concluded that deliberate, conscious reading strategies may result when students are directed to read to be able to retell or recall information and that the strategies students report using when asked to read narrative materials may differ from the strategies they report when asked to read expository material. The findings of the Soviet researchers also suggest that below the sixth-grade level students may not be able to describe their reading-study behavior, but sixth-graders and older students should be able to do so.

Even though the results of some of the introspective-retrospective studies reviewed indicate that students differ in their ability to describe the strategies they use to read and study texts, the investigators of these studies lacked a theoretical reason for using students' verbal reports as a basis for studying reading performance. In the next section, literature will be reviewed which provides theoretical support for investigating what students say about their reading-study behaviors and which provides a framework for relating students' verbal reports about their reading-study behaviors to other aspects of reading performance.

THE CONSTRUCT OF METACOGNITION

Metacognition is a construct developed by Flavell (1971) as a framework for studying how people use knowledge about themselves, knowledge about strategies, and knowledge about tasks to solve cognitive problems. The term metacognition refers to types of introspective knowledge and insight people have about how their own minds work. For example, most people usually know when they have or have not understood something they have read, they know if they are or are not good at solving math problems, and they know when they need to take notes or do not need to take notes over material they want to remember. Each of these examples represents types of metacognitive insight and information students can use to guide their efforts at solving problems such as overcoming reading comprehension failures, studying for tests or writing term papers.

Flavell (1971, 1976) originally formulated the notion of metacognition as a framework for identifying the types of insight and knowledge young children develop about their own ability to remember and to investigate how children come to use such knowledge to control their own efforts at trying to remember information. Other researchers have since adopted the construct of metacognition as a framework for studying the development of social cognition, self-control, and problem-solving ability in young children and developmentally disabled students (Meichenbaum, et al, in press; Mischel, 1979; Campione & Brown, 1977, 1979; Resnick & Beck, 1976), and some researchers have

recently developed new models of intelligence which incorporate metacognitive notions as one aspect of performance that underlies intelligent action (Campione & Brown, 1979; Sternberg, 1979). Markman (1978) and Flavell, Speer, Green, and August (Note 1) have used the construct of metacognition to investigate young children's development of oral comprehension-monitoring skills, and Brown (1977), Baker (1979) and Anderson (1979) have applied the notion of metacognition in their research on comprehension-monitoring in reading and study situations. These researchers are trying to identify the types of information and insight readers have about their own reading-comprehension and reading-study behavior and to investigate how readers use such knowledge and personal insight to control their own efforts at understanding and studying texts.

Brown (in press) and Flavell (1978b, 1979) are two researchers who have written extensively about the role of insight or self-awareness in learning. The types of knowledge they refer to as metacognitive knowledge differ from other types of information people have in memory only in that these researchers are interested in identifying how people use what they already know to help them acquire new information or to help them solve problems. Both Brown (1977) and Flavell (1978b) believe that students acquire metacognitive forms of knowledge and insight through schooling or formal education experiences such as learning to read, to write, and to take tests. Neither researcher believes that metacognitive forms of knowledge are always used by students at a conscious level of awareness, but they do

believe that students can consciously think about what they know and that students can use what they know deliberately or consciously when they are trying to learn new information, solve problems, or overcome comprehension difficulties.

Metacognition and Reading

Brown (in press) and Baker and Brown (in press) roughly divide the domain of metacognitive research related to reading into two areas. The first area of research concerns attempts by various investigators to determine the types of metacognitive strategies students can use to monitor and control their own comprehension or study efforts as well as to identify the types of strategies students engage in to overcome comprehension or study failures.

Brown (in press) specifically characterizes metacognitive skills related to reading comprehension as the same skills reading educators describe when they talk about reading for study purposes. Metacognitive reading skills represent strategies students are assumed to use when they are expected to read and study texts independently. Application of these skills is supposed to result from self-generated decisions made during the process of reading and studying. These decisions ostensibly allow students to plan, monitor, and control their own reading-study behavior. The metacognitive skills described by Brown (in press) mirror traditional notions of reading-study skills as they are the conscious application and adaptation of basic reading skills to specific tasks and materials.

The second area of research concerns studies conducted to identify the forms of knowledge students could develop about (1) themselves as readers, (2) strategies for reading, and (3) how to read different types of texts for different purposes. This is the area of metacognitive research most directly related to the study reported here. A basic hypothesis among researchers interested in metacognitive development is that students develop metacognitive forms of knowledge about reading tasks and strategies before they develop the ability to monitor and control their own comprehension and study behavior (Baker & Brown, in press; Brown, 1977; Brown, in press). Typically, researchers rely on the results of introspective-retrospective studies by reading researchers as evidence that students differ in their awareness of reading tasks and strategies (Baker, 1979; Baker & Brown, in press), but some researchers have attempted to identify (1) the age at which students begin to consciously use knowledge of a reading-study strategy to improve their ability to remember information after reading, and (2) the types of knowledge young students and older students have about some of the variables that affect their reading comprehension behavior.

Research on the Development of a Reading-Study Strategy. Studies by Brown and Smiley (1977a, 1977b) and Brown, Smiley, and Lawton (1977) were conducted to identify the age at which students might be expected to show purposeful study behavior. The studies were designed to examine the development of students' ability to identify the main idea of stories consciously and to use that knowledge to improve

their attempts at recalling stories. Students from third grade through college participated in the studies. A basic prediction was that students who were unable to distinguish the levels of structural importance within a story would not be able to select the most important units of stories for deliberate study purposes. Results of an early study conducted by Brown and Smiley (1977a) indicated that third- and fifth-grade students were able to recall the most important idea units in stories, but they were not able to consciously identify the important units in stories when specifically asked to do so. Results of studies by Brown, Smiley, and Lawton (1977) and by Brown and Smiley (1977b) replicated and extended the findings of the first study by Brown and Smiley (1977a).

Students participating in the studies conducted by Brown, et al (1977) and by Brown and Smiley (1977b) were asked to read and recall Japanese folktales. The stories had been analyzed into units of thematic importance according to Johnson's (1970) structural analysis procedure, and each of the idea units from the stories was typed on an individual card. After their initial recall efforts, the students were allowed to study the story/stories again. They were asked either to (1) select idea units from the cards, (2) take notes on the ideas, or (3) underline idea units that they concentrated on to improve their initial recall attempts.

The investigators found fifth graders were able to recall the most important idea units, but when asked to select important units

from cards and to underline or take notes on the important information in stories, fifth-graders were unable to discriminate among the various levels of structural importance. Seventh-graders were able to distinguish between the most important and least important units, and they appeared to use that knowledge as a strategy to improve their recall attempts. However, only eleventh- and twelfth-grade students were able to consciously distinguish all four units of structural importance and, thereby, improve their recall of information from the two most important levels of the text structure. Brown and Smiley (1977b) and Brown, et al (1977) attributed the more systematic or strategic behavior demonstrated by older students to their growing metacognitive awareness of how to read and study texts.

Interview Studies. Myers and Paris (1978) and Canney and Winograd (1979) used structured interview procedures to identify the types of responses young students and older students gave when asked to describe what they knew about reading. Myers and Paris (1978) compared the responses of second-grade students and sixth-grade students questioned about their knowledge of how personal abilities (e.g. age and motivation), tasks (e.g., reading long versus short texts), and strategies (e.g., imaging and rereading) influenced their ability to understand and study printed materials. Canney and Winograd (1979) interviewed students classified as good and poor readers in grades two, four, six, and eight to determine the students' conceptions of the nature and purposes of reading. Results of both these studies

indicated that older students were more aware than younger students that reading involves meaning-getting processes. Young students in both studies and students classified as poor comprehenders in the study reported by Canney and Winograd (1979) described reading as a process of being able to pronounce or sound out words.

Myers and Paris (1978) claim that the results of their study suggest that age-related differences in students' awareness of how person, task, and strategy variables influence comprehension may be correlated with the acquisition of efficient reading skills. And from the results of their study, Canney and Winograd (1979) concluded that an interview procedure could be used to identify students' knowledge of the nature and purposes of reading and that students' knowledge of the nature and purposes of reading might be useful in discriminating among groups of good and poor readers. Canney and Winograd note, however, that their conclusions were based on pilot data that had not been tested for statistical significance.

Baker and Brown (in press) have criticized the results and conclusions of the studies reported by Myers and Paris (1978) and by Canney and Winograd (1979). Baker and Brown (in press) and Brown (in press) argue that the verbal reports of young children are highly unreliable in that what young children say they do is usually not related to the way they perform. And, as noted by Brown (1977, in press), students' metacognitive insights related to reading are usually late in developing and even college-aged students may not be aware of

many of the factors that influence their ability to read and learn from texts.

Reliability of Interview Data. Metacognitive forms of knowledge are personal, introspective types of information. The most direct method of assessing what insights students might have about solving cognitive problems is to ask students what they are doing as they solve problems such as reading to understand or to remember (Meichenbaum, et al, in press). Because researchers, especially those who are concerned with metacognitive aspects of performance, are beginning to rely on subjects' self-reports or introspective responses as a type of scientific evidence, researchers have begun to develop methods for establishing the reliability of self-report information and for improving the accuracy of subjects' self-reports.

Lieberman (1979) suggests that the accuracy of students' self-reports can be assessed by checking to ensure that different subjects independently report the same type of information and by demonstrating that subjects' responses are correlated with other forms of evidence related to the domain being studied. Meichenbaum, Burland, Gruson, and Cameron (in press) also have suggested several ways in which the reliability of self-report information can be established and improved. These writers suggest that researchers (1) use multiple assessments on the same task, (2) select experimental tasks that are not well-rehearsed by subjects participating in a study, and (3) compare the subjects' responses to some predetermined check-list or

classification system derived from previous research or from a logical analysis of the task demands involved in solving the experimental problem.

Both Borkowski (in press) and Meichenbaum, et al (in press) support the use of self-report data in studies related to metacognitive development, but they caution that such data may be useful only insofar as it can be shown to have concurrent and predictive relationships with other behaviors and criteria. Moreover, Meichenbaum, et al (in press) claim that interview data obtained in studies designed to identify students' metacognitive insights about reading, such as the data reported by Myers and Paris (1978), can gain importance only if the interview data can be shown to add more to our understanding of and ability to discriminate among different populations of readers than is currently provided by the results of reading test-score data.

As previously noted, Baker and Brown (in press) are especially critical of the studies reported by Canney and Winograd (1979) and Myers and Paris (1978). In these studies students were required to imagine hypothetical reading situations and then to describe how they thought they would perform in these imaginary situations. Instead of relying on student reports about how they imagine they might perform, Baker and Brown (in press) argue that evidence related to students' metacognitive insights about reading should be based on observations of children as they actually perform the type of reading

task being investigated. Because of these criticisms, Baker and Brown (in press) cite the results of introspective-retrospective studies conducted by Strang and Rogers (1965), Smith (1967), and Olshavsky (1975, 1978) as evidence that students can reflect on the strategies they use to comprehend. Baker and Brown commend these researchers because the results and conclusions they reported were based on responses provided by students in reference to reading tasks they actually performed.

Summary of Research Related to Metacognition. To summarize, the construct of metacognition has provided researchers with a new framework in which to view students' awareness of strategies for understanding and learning information from prose materials. According to this view, students develop knowledge of how personal abilities, different tasks, and different strategies influence their problem-solving behaviors as well as the ability to use these types of knowledge deliberately to monitor and control their own efforts at solving problems. Presumably, students develop metacognitive insights as they learn how to read, to write, and to take tests. Researchers do not believe that students' performance always reflects metacognitive levels of awareness, but they do believe that students can become aware of the knowledge they do have when they are engaged in active attempts to learn or to solve problems. Brown (1977, in press) has specifically characterized metacognitive skills and knowledge related to reading as the type of skills reading educators refer to as reading-study skills. Although most researchers assume that

students develop metacognitive types of knowledge related to reading through school experiences and some researchers have characterized metacognitive reading strategies as similar to traditional notions of reading educators, no studies were located which directly addressed this issue.

The notion of metacognition is relatively new, and most researchers concerned with metacognitive aspects of reading performance have focused on identifying the strategies older students use to monitor their comprehension behavior and to overcome comprehension failures. However, some researchers (Brown & Smiley, 1977a, 1977b; Brown, et al, 1977) have shown that older students appear to use their knowledge of strategies for identifying important information in stories deliberately to improve their recall of information from stories. Even though the studies reported by Brown and her associates suggest that older students are able to deliberately select important ideas from stories for further study efforts, important ideas in stories may differ from important ideas in expository passages. In most school settings, students are expected to study and learn from expository materials; yet it is not clear that the strategies students use to study and understand narrative materials are necessarily the same strategies they use to study and understand expository materials.

Two studies were reviewed in which researchers (Myers & Paris, 1978; Canney & Winograd, 1979) attempted to identify how students of

various age and proficiency levels differed in their insights about reading and the factors that influence their comprehension and study behaviors. The general conclusion drawn by the investigators in both studies was that older students are more aware than younger students that reading involves understanding ideas. However, the results of these studies have been criticized by several researchers. The criticisms center on the fact that the investigators in the interview studies failed to establish that their subjects' responses were reliable in terms of some other measure of comprehension performance. Because of this, researchers such as Baker and Brown (in press) have relied on the results of introspective-retrospective studies in reading as evidence that students can talk about their reading comprehension performance and as suggesting that students' ability to reflect on their reading performance may be a factor that can be used to distinguish students who are and students who are not good comprehenders.

MEASURING COMPREHENSION

Two types of comprehension measures, recall tests and criterion-referenced tests, were used in the present study to help determine the reliability of students' verbal reports. In this section, literature is reviewed which relates to these comprehension measures.

Both recall tests and criterion-referenced tests have become popular measures of comprehension in the past decade. Recall tests provide researchers with an index of how much and what types of

information people remember after reading a specific text under specific reading conditions. Use of recall tests has increased because of the development of formal systems for representing the underlying meaning and meaning relationships among ideas in prose materials. Whereas recall tests provide information about the specific content people remember from texts after reading, criterion-referenced tests provide information about students' attainment of skills that they could potentially use to help them understand the content of the texts they read. Although some controversy surrounds the use of criterion-references tests, this type of test was developed specifically to provide classroom teachers with a system for diagnosing and assessing students' attainment of specific instructional objectives related to comprehension skill performance.

Recall Tests

Results of the retrospective studies conducted in the Soviet Union (Smirnov, 1973; see page 17) indicated that students' reading strategies were influenced by the type of test they expected to follow their reading. Students who participated in these studies reported they were more aware of the strategies they used when they read to be able to pass a recall test than they were of the strategies they used when they read to be able to pass a recognition test. Although free and probed-recall tests have been used by American researchers in the past, many of the findings of the studies in which recall tests were used are considered suspect because researchers did

not have reliable techniques for scoring subjects' recall of information from texts (Carroll, 1971; 1972). Reliable and objective techniques have been developed only in the past five to six years by linguists and psychologists interested in studying how people produce and comprehend written and spoken discourse.

Recent interest in discourse processing stems, in part, from the development of prose analysis systems, or discourse grammars, which have been created to represent the underlying, semantic meaning of texts. Some of these systems have been developed to study the comprehension processes involved in understanding and remembering narrative passages (Mandler & Johnson, 1977; Stein & Glenn, 1979; Thorndyke, 1977), whereas other systems have been developed by researchers in the field of artificial intelligence to model comprehension processes through computer simulations (Schank & Abelson, 1977; Rumelhart, 1975). Many of these systems have been devised by researchers concerned with representing the meaning and structure of extremely short, simple narratives. However, the prose analysis systems developed by Meyer (1975), Kintsch (1974), and Fredericksen (1975) have been used to analyze longer, more complex expository passages.

Meyer's Representation System. Meyer (1975) developed a prose analysis system to represent the meaning and organizational structure of information in expository texts. Her system was created specifically to provide researchers with an objective method of scoring free-recall protocols so that recall could be used reliably as a measure of reading and listening comprehension. Her analysis system

has been shown to be an objective, reliable method for representing the meaning and organizational structure of different types of expository and narrative passages and as a method of scoring subjects' recall of information from expository and narrative texts (Meyer, 1975, 1977, in press).

The system developed by Meyer provides a way to represent the meaning of ideas in simple sentences as well as a way to represent the overall organizational structure of ideas in prose passages. Meyer uses a system similar to Fillmore's (1968) case grammar to represent the meaning, or semantic, relationships between ideas in simple sentences, and she uses Grimes' (1975) semantic grammar of propositions to identify and describe the meaning relationships between and among ideas in sentences and paragraphs. She also uses Grimes' grammar to identify and label the overall organizational structure of ideas in a text. For example, Meyer uses Grimes' system to identify texts which are organized in problem-solution relations, cause-effect relations, and comparison-contrast relations.

Meyer has used her system primarily as a basis for studying how the global or overall organizational patterns in texts influence what people recall after reading. Results of research by Meyer and her associates indicate that these organizational patterns influence how much information people recall after reading and that the various types of organizational patterns that occur in texts differently affect the amount of information people recall (Meyer, 1975; Meyer &

Freedle, Note 2). For example, Meyer and Freedle (Note 2) had groups of subjects read texts with the same content but different organizational structures. Meyer and Freedle found that subjects who read texts organized with a descriptive structure recalled less information than subjects who read the same information in texts organized in contrastive or problem-solution patterns.

Although results of research conducted by Meyer and her associates provide support for using Grimes' (1975) semantic grammar of propositions to identify the global structure of information in texts, it is not clear that other aspects of Meyer's representation system are useful for analyzing more detailed information such as the type of information which occurs at lower levels in the semantic structure of a text. Meyer's representation system is limited to representing the meaning of a text as that meaning was expressed by its author; so the system cannot be used to represent the types of information readers must infer to understand information implied but not directly stated by authors. Much of this implied information seems to occur at lower levels in a semantic representation of the meaning of a text.

Results of research conducted by Kintsch (1974) and Fredericksen (1975), however, demonstrate that certain inference processes must occur during reading for texts to be comprehensible. Such inferences are made by readers either on the basis of their prior knowledge or on the basis of information stated in previous

portions of the text being read. This means that at least the types of information or knowledge readers use to maintain referential connectivity among the ideas in a text must be included in any prose analysis system if the meaning of a text is to be fully represented. Since Meyer's system cannot be used to represent such implicit information, it cannot be used to score the types of non-reproductive (nonveridical) recall which results from inferences readers make as they read.

Both Fredericksen (1975) and Kintsch (1974) have developed prose analysis systems that they use in their research. These systems are part of comprehension and memory models so they can be used to identify points in a text where readers might make inferences and to represent the types of information readers might infer at various places in a text. The system developed by Fredericksen (1975), however, is extremely complex, and he has used it primarily as a basis for analyzing the meaning of very short, simple stories in order to identify the inference operations that seem to occur when young children read or listen to stories such as those that appear in basal reading materials used for beginning reading instruction (Fredericksen, 1979).

Kintsch's Representation System. Kintsch's (1974) representation system is similar to Meyer's except that Kintsch's system was created as part of a theoretical model of text comprehension and recall production. Within his system, the conceptual, underlying meaning of the information in a text is represented by a connected, partially

ordered list of propositions (idea units). Kintsch refers to this level of representation as the microstructure of a text because all of the ideas expressed or implied by the author of a text are represented at this level. Although Kintsch's system includes higher levels of representation, such as a macrostructure and a global schematic structure, these levels are assumed to be the result of certain psychological processes which are not related to the study reported here (Kintsch and van Dijk, 1978; Kintsch, 1979).

Propositions in the microstructure of a text represent the semantic relationships between and within sentences. Like Meyer, Kintsch (1974) adopted a system similar to Fillmore's (1968) case grammar to represent the meaning relationships within simple sentences. A set of connective propositions is used to represent the meaning relationships between and among sentences as well as longer units of text. These connective propositions are similar to the types of semantic relations specified in Grimes' (1975) semantic grammar of propositions. Kintsch, however, does not use these propositions as a basis for identifying the overall organizational structure of texts.

Results of studies reported by Kintsch (1974) and Kintsch, Kozminsky, Streby, McKoon and Keenan (1975) provide empirical support for using Kintsch's microstructure representation system as a technique for representing the meaning of a text and for scoring subjects' recall of information from texts. The findings reported by

Kintsch (1974) and Kintsch, et al (1975) indicate that the structure of information in prose materials influences the amount and type of information that will be remembered after reading. Although Meyer (1975) reported similar findings using her representation system, Meyer's system is atheoretical and cannot be used to identify implicit, referential information readers must infer to understand discourse material.

Even though Kintsch's system for representing the micro-structure of a text cannot be used to identify the overall organizational pattern of ideas in a text, procedures for using his analysis system have been explained in detail so that other researchers can also use his system. Turner and Greene (1978) have published a technical manual that explains both how to use Kintsch's system for analyzing texts and how to use his system for scoring subjects' recall protocols. The procedures for using Meyer's system, however, are less well defined, especially in terms of how to analyze ideas that occur at lower levels in the meaning structure of texts and in terms of how to use her system for scoring subjects' recall protocols.

Recall tests are currently used to measure how much and what kinds of information subjects remember after reading. Some of the prose analysis systems used to score subjects' recall are integral components of theoretical models of comprehension and recall processes currently being developed. Hopefully research related to these models will eventually provide educators with insights about

strategies students can use or be taught to use to improve their ability to understand and learn from printed materials. Most of these models are still in a developmental phase; and at this time, they cannot be used as a basis for inferring types of strategies or skills that students can use or be taught to use to comprehend prose materials. Criterion-referenced tests, on the other hand, were specifically developed to provide classroom teachers with a system for diagnosing and assessing students' ability to use traditional types of reading skills.

Criterion-Referenced Tests

Criterion-referenced tests became popular during the late 1960's and early 1970's as an alternative to norm-referenced testing procedures. Norm-referenced tests provide educators with a measure of how well students perform compared to other students on global measures of academic achievement or ability. Many educators, however, feel that norm-referenced tests cannot be used to provide classroom teachers with information about the specific types of instruction students need or about how well students learn the skills or information in which they receive instruction. Criterion-referenced tests were developed to provide teachers with these types of information in that criterion-referenced tests can be used to assess students' academic performance in relation to predetermined standards of performance which are tied to specific instructional objectives (Green, 1977; Popham, 1978). That is, criterion-referenced

tests were specifically developed to help teachers diagnose students' instructional needs, plan appropriate forms of instruction, and assess students' performance following instruction.

The concept of criterion-referenced testing grew out of educational notions related to mastery learning and educational accountability (Glaser, 1963; Meskauskas, 1976; Hambelton, et al, 1978), and use of this type of test is still a subject of controversy among educators and among researchers interested in testing and measurement issues. Advocates of criterion-referenced tests argue that these measures are more useful to educators than norm-referenced tests because criterion-referenced tests can be used to assess students' attainment of specific and distinct instructional learning objectives (Hambelton, et al, 1978; Popham, 1978). Advocates of norm-referenced tests, however, argue that most areas of instruction involve skills and knowledge that are too numerous and interdependent to be studied or assessed separately. They argue for more global measures of achievement that can be used to assess students' broad, general level of knowledge and skill achievement rather than students' mastery of a few specific objectives (Ebel, 1978). However, use of criterion-referenced tests and the kinds of specific instructional objectives associated with criterion-referenced tests is increasing, especially in states with minimal competency laws regarding (1) students progression from grade-to-grade and (2) standards students must meet to receive a high school diploma (Pipho, 1977).

Criterion Referenced Tests and Reading Instruction. One of the most appealing facets of criterion-referenced tests for reading educators is that they provide teachers with tests that are directly tied to what they teach. Instead of having to rely on global measures of comprehension as a basis for planning instruction, teachers can use the results of criterion-referenced tests to determine each student's strengths and weaknesses related to specific skills and then provide students with instruction appropriate to their individual needs.

Early use of criterion-referenced tests by reading educators is reflected in the emergence of numerous skills-management programs published by various companies early in the 1970's to provide reading teachers with systems for diagnosing, teaching, and assessing specific reading skills (Thompson & Dziuban, 1973; Stallard, 1977). Skills management systems, and the criterion-referenced tests which accompany these systems, have been criticized by some reading educators for many of the same reasons that advocates of norm-referenced tests argue against criterion-referenced tests (Johnson & Pearson, 1975; Bagford, 1977; Johnson, 1977). Nevertheless, publishers of many of the major basal reading series have incorporated skills management systems and criterion-referenced tests as some of the essential components of their total instructional reading program. Thus, criterion-referenced tests are being used increasingly by teachers to organize and plan reading instruction.

Many publishers of criterion-referenced tests of reading skill development provide little information about the reliability of the individual tests or subtests they have developed to assess students' attainment of specific decoding or comprehension skills (Thompson & Dzuiban, 1973; Pearson & Johnson, 1978). Yet some commercially available tests, such as the Wisconsin Tests of Reading Skill Development (WTRSD), have been shown to have high reliability standards (Otto, et al, 1974; Klopp, et al, 1978).

The validity of criterion-referenced tests, especially criterion-referenced tests of comprehension skill ability, is a subjective issue. No general theory that accounts for the mental processes underlying comprehension performance exists at this time. Thus, the validity of any test of reading comprehension must be based on the judgment of people considered to be experts in the field of reading. In general, criterion-referenced tests are considered to have good content validity if they test the skills that are actually taught or if they test skills that are included in many instructional reading programs (Pearson & Johnson, 1978).

The Wisconsin Tests of Reading Skill Development: Comprehension (WTRSD) are a set of criterion-referenced tests developed to measure students' attainment of the instructional objectives of the Wisconsin Design for Reading Skill Development: Comprehension (WDRSD). The WDRSD is a skills-management system designed to help students develop reading skills in grades 1-6 (Otto & Kamm, 1977).

The WTRSD have also been found to be highly reliable instruments for assessing skill proficiency with students who have and students who have not received instruction in the specific skills developed in the WDRSD (Klopp, et al, 1978). And the types of skills assessed through these tests are representative of the kinds of skills taught in widely used basal reading programs as the tests were developed after an extensive review of research and an analysis of instructional reading programs to identify skills commonly taught in major basal reading series (Otto, et al, 1974; Otto, 1977).

Summary of Literature Related to Comprehension Measures

To summarize, both recall tests and criterion-referenced tests of comprehension skill ability have been used extensively as measures of comprehension performance. Recall tests provide a measure of the amount and type of information people recall after reading. From the research reviewed, it appears that Kintsch's prose analysis system can provide a reliable method for representing the meaning of a text and for scoring subjects' recall of information from texts they are asked to read. Criterion-referenced tests are used to assess students' ability to use particular types of comprehension skills; and from the literature reviewed, it seems that the WTRSD can be used to measure students' ability to use traditional types of comprehension skills such as those developed in widely used basal reading series.

The next section provides a summary of all of the literature reviewed to this point as well as the implications of this literature for the present study.

SUMMARY OF LITERATURE REVIEWED AND IMPLICATIONS: RATIONALE FOR THE STUDY

The purpose of this section is to summarize the literature reviewed in this paper and to present a rationale for using an introspective-retrospective interview procedure to identify the strategies students use to comprehend and study an expository text.

Summary and Implications

Even though an abundance of teaching techniques and commercial materials exist for helping students develop reading comprehension ability, there is little evidence that the skills students use to understand printed materials are the same skills taught through these instructional activities. A major problem with most of the studies conducted to identify specific reading comprehension skills is that the products of comprehension in the form of test scores were used both to investigate and to characterize the process of comprehension. Many reading authorities in the past (Gray, 1958; Strang, 1962) have criticized research techniques in which test scores or "outcome" measures were used to study reading comprehension because the use of such techniques precludes the development of new insights about the process of comprehending. That is, the only conclusion that can be drawn from most of these studies is that the processes of reading

comprehension consist of the skills measured by tests of reading comprehension (Simon, 1971). Recently, Farr and Weintraub (1974-75) and Wolf and Tymitz (1976-77) have again questioned the exclusive use of measurement or behavioral research paradigms within the field of reading research. They claim that more studies are needed that examine students' reading behavior as they are actually performing reading tasks.

Specifically, Wolf and Tymitz (1976-77) charge that product-oriented research and traditional experimental designs are not suitable for discovering new relationships or insights about the process of reading comprehension as it occurs in natural settings. They claim that most investigators treat reading as though it were a "static set of skills (p. 2)" rather than a process in which isolated skills become integrated into the reading process students use on a day-to-day basis. The intent of the article written by Wolf and Tymitz was to argue for an increased acceptance of ethnographic approaches for studying reading behavior, but they commend Strang's (1962) and other researchers' use of case studies and introspective interviews as types of research strategies needed within the field of reading education. Wolf and Tymitz endorse both these approaches because they are attempts to incorporate within a research paradigm some of the contextual variables which influence reading behavior. Both case studies and introspective interviews are process-oriented research strategies which focus on how readers comprehend rather than on identifying what or how

much readers comprehend.

Introspective-Retrospective Studies. As noted, many of the former introspective-retrospective interview studies in reading were conducted to identify the underlying mental or cognitive processes of comprehension. The results of these studies are questionable because the relationship between a mental process and a subject's knowledge of that process is unknown. However, four introspective-retrospective studies were reviewed in which the researchers investigated the strategies rather than the covert mental processes students used to comprehend prose materials. The results of these studies suggest that an introspective-retrospective interview procedure can be used to identify the strategies good and poor readers say they use to comprehend and that students' descriptions of the strategies they use can be classified reliably into categories of reading-study skills common to many instructional reading programs.

The purpose of the present study was to identify the strategies good and poor readers said they used to comprehend and study an expository text and to relate these strategies, if possible, to skills commonly taught in elementary school reading programs. Current reviews conducted by Mason, Osborn, and Rosenshine (1977) and by Johnson and Barrett (in press) focused on identifying the types of comprehension skills common to many currently used instructional reading programs. Eight skills were found to be common across the entire range of materials examined by these writers, and these skills

were also the most frequently occurring skills in the instructional materials examined. The eight common skills identified by Mason, et al (1977) and Johnson and Barrett (in press) are: (1) locating details, (2) recognizing main ideas, (3) recognizing sequences of events, (4) drawing conclusions, (5) recognizing cause and effect relationships, (6) understanding words in context, (7) making interpretations (judgments and generalizations), and (8) making inferences from the text.

Results of interview studies in which subjects were asked to describe the strategies they used to understand narrative material suggest that good and poor readers report using similar types of strategies but they differ either in the frequency with which they report using strategies or in their awareness of the strategies they use (Smith, 1967; Olshavsky, 1975, 1978). However, findings of studies conducted by Soviet researchers suggest that students may report using different types of strategies, depending on the type of material they are asked to read. Thus, it is not clear that good and poor readers differ in their awareness of the strategies they use to understand expository texts, nor is it clear that the strategies students describe using to understand an expository passage are the same types of strategies students described using when asked to read narrative materials. The present study was designed to examine this issue.

Although the results of the introspective-retrospective interview studies reviewed indicated that students could talk about the

strategies they used to understand and study printed materials, the investigators of these studies did not have a theoretical basis for accepting students' verbal reports as information relevant to any aspect of cognitive performance. One such conceptual framework, metacognition, was described in the literature reviewed.

Metacognition. Metacognition is a construct developed by Flavell (1978a) to study how students' knowledge about tasks, strategies, and themselves as learners affects their ability to solve cognitive problems. Metacognitive knowledge refers to a person's ability to use his past knowledge and experience to solve problems such as reading to be able to remember information from texts. According to Flavell's (1978b, 1979) and Brown's (in press) characterization of metacognitive knowledge and skills, students should be able to describe the strategies they use to understand printed materials because such insight is probably acquired through experiences such as learning to read and learning to write in school. Based on this characterization, it seems that students' descriptions of the strategies they use to understand and study printed materials should be related to traditional types of comprehension skills such as those identified by Mason, et al (1977) and Johnson and Barrett (in press). No studies, however, were located in which researchers concerned with metacognitive aspects of performance have specifically tried to relate the strategies students say they use to types of skills commonly taught in elementary school reading programs.

A basic assumption made by investigators studying meta-cognitive development is that students' ability to describe their problem-solving behavior should become more conscious and deliberate when (1) they are asked to read for study purposes, or (2) they are working at overcoming comprehension difficulties. This suggests that if students are to be able to describe the strategies they use to understand and study prose materials they should either expect to have to recall information they read or they should be asked to read texts that pose comprehension difficulties. Results of retrospective interview studies conducted in the Soviet Union during the 1940's partially support this assumption. The results of the Soviet studies indicated that adults were more aware of the strategies they used to understand when their purpose was to be able to recall rather than recognize information they read. However, results of a study reported by Olshavsky (1978) also suggest that even good readers may not be able to describe the strategies they used to comprehend prose materials if the material they are asked to read is too difficult for them to understand.

The results of the Soviet studies reviewed (Smirnov, 1973) also indicated that students who were younger than most sixth graders were unable to describe the strategies they used to understand and study printed materials. Both Smirnov (1973) and Brown and Smiley (1977b) reported that young students were able to recall important information from the texts they were asked to read and study but they were unable to consciously describe or identify the important ideas in texts when

specifically asked to do so. Moreover, Robinson (1965) found that fourth-grade students could talk about the skills they used to understand and study social studies materials, but examination of the tasks in which students were required to use these skills indicated that many of the students could not use the skills successfully. These findings are also consistent with much of the literature related to metacognitive development as Brown (in press) believes that middle-school aged students can reliably talk about the strategies they use to understand printed materials but that the verbal reports of younger students are much less reliable in the sense that what young students say they do may not be related to how they actually perform. Based on these findings, students participating in an introspective-retrospective interview study for the purpose of describing the strategies they use to understand and study should be at least the age of most middle-school or junior high school students.

Because of the wide-spread interest among psychologists in the notion of metacognitive development, researchers are suggesting ways to improve the reliability of subjects' verbal reports (Lieberman, 1979; Meichenbaum, et al, press; Borkowski, in press). Some of these procedures include determining if subjects' verbal reports can be used to discriminate among groups of people who differ in their problem-solving proficiency and to determine if subjects' verbal reports are correlated with or predictive of other measures of skill performance. Other procedures that have been suggested for improving the reliability of self-reports include using multiple assessments on the same

task, using tasks that are not well rehearsed, and comparing students' responses against some predetermined check-list or classification system. The present study was designed to address each of these issues.

A basic assumption within the field of reading education is that students should be taught basic comprehension skills which they can then adapt into strategies for reading and studying texts in all subject-matter areas. Similarly, Baker and Brown (in press) believe that students develop metacognitive knowledge and insights about the strategies and tasks involved in skilled reading performance before they develop the ability to use these forms of knowledge to help them monitor and control their own comprehension and study efforts. These writers cite the results of introspective-retrospective studies in reading as evidence that students do have knowledge of the strategies and tasks involved in reading. Yet most of the introspective-retrospective studies cited by Baker and Brown were conducted to identify the strategies students said they used to understand narrative materials. Most students, however, are expected to read, study, and learn from expository instead of narrative materials. The results of introspective-retrospective studies previously reviewed in which students were required to read expository material were pilot studies or studies conducted in the Soviet Union. In both instances, the results of the studies were described in global, descriptive terms; thus, little information exists about the strategies students say they

use to understand expository materials.

The purpose of the present study was to test the assumption that students adapt the skills they are taught in the elementary grades into strategies for reading and studying texts in all subject-matter areas. That is, the purpose of the study reported here was to determine if the strategies students said they used to understand an expository passage were related to types of basic comprehension skills such as those developed in many elementary school reading programs. The dependent measures with which this study was concerned were: (1) the types of strategies students said they used to understand an expository passage, (2) the frequency with which students said they used particular strategies, (3) the amount of information students recalled after reading, and (4) students' total score on a set of criterion-referenced tests of comprehension skill ability.

RESEARCH QUESTIONS INVESTIGATED

Few studies have been reported which focused on identifying the strategies students use to study and understand expository materials. This study was designed specifically to identify such strategies. Moreover, although Brown (in press) has suggested that metacognitive forms of knowledge and insight are similar to types of reading-study skills described by reading educators, no studies have been reported which address this issue. Due to the lack of previous research findings concerning students' insights about their reading-study behavior and to the exploratory nature of the present study, the

following research questions, rather than specific hypotheses, were explored:

Given that the goal of reading is to recall information from an expository passage:

1. What types of strategies do good and poor readers report using when they are asked to describe how they read and studied a normal text or a disrupted text?
2. Do good and poor readers differ in the frequency with which they report using particular reading-study strategies when they are asked to read a normal or a disrupted text?
3. Do students who frequently report using reading-study strategies recall more information than students who report using reading-study strategies infrequently?
4. Can the types of reading-study strategies students report using when asked to read a normal and a disrupted text be used to predict mastery or non-mastery of a set of criterion-referenced tests of comprehension skill ability?

Summary

The present study was designed to identify the strategies students said they used to study and understand an expository passage. The primary goal of the study was to determine if students talked about using strategies that are similar to basic types of comprehension skills, and a secondary goal of the study was to determine if students' verbal reports could be used to (1) discriminate between students classified as good and poor readers, (2) distinguish between students who recalled more information than other students after reading, and (3) predict mastery or non-mastery of a set of criterion-referenced tests of comprehension skill development.

METHOD

An interview procedure was employed to identify students' insights about the strategies they used to study and understand an expository passage. The purpose of the study was to determine if students' descriptions of their reading-study strategies are similar to the types of comprehension skills that are commonly found in the instructional materials used to teach reading in the elementary grades. Interview procedures for the study were established in a pilot study. In this chapter results of a pilot study are summarized before describing (1) the interview method used in the present study, and (2) the procedures used to analyze the data collected in the study.

PILOT STUDY

While researchers have used a variety of methods for obtaining students' descriptions of their reading-study behavior, the methods differ in two essential ways: (1) the amount of delay between subjects' initial reading of a text and their description of the strategies they used to understand the text, and (2) the amount of text subjects were asked to read before they stopped to describe the strategies they used to understand and study. Meichenbaum, et al. (in press) suggest that the accuracy of self-report information can be improved by minimizing the delay that occurs between subjects' solving a problem and subjects' describing or reporting the strategies they used to solve the problem. Thus, the researcher decided to use an

introspective rather than a retrospective interview procedure (see p. 10) to minimize the delay between subjects' reading and studying a unit of text and their descriptions of what they did to study and understand the text. However, it was still unclear to the researcher how much information students should be asked to read before describing the strategies they used to study and understand the information. The pilot study was conducted primarily to (1) establish at which point in a text students would be stopped to describe their reading-study strategies, and (2) establish procedures for classifying student responses into categories of comprehension and study behaviors. A complete description of the procedures used in the pilot study and the results of the study are given in a working paper (Camperell & White, Note 3); the procedures followed in the study and the major results of the study are summarized here.

Interview Procedures

An unstructured interview procedure (Maccoby & Maccoby, 1954; Pines, et al., 1978) was used to determine the types of responses students gave when asked to read different amounts of information before they described the strategies they used to study and understand. Students were asked to read and study an expository passage, approximately 1,350 words long. The passage is about a desert environment, and the readability of segments of the passage, as measured by the Fry Readability Formula, ranges between sixth- and eighth-grade levels. Meichenbaum, et al. (in press) suggest that the accuracy of self-report information can be improved if students are asked to solve

problems or complete experimental tasks that are not well rehearsed. Borkowski (in press) and Meichenbaum et al (in press) suggest that students should become more aware of the knowledge and strategies they use to solve problems in situations where habitual ways of acting fail and in which students must make specific choices and judgments. Because reading for most students is a well-rehearsed task, the researcher (1) selected a passage with unfamiliar content to use in the pilot study, and (2) created a disrupted version of the passage to use in the pilot study in which students would have to make specific choices and judgments about information in the passage.

Two seventh-grade and six sixth-grade students participated in the study. The seventh-grade students were acquaintances of the investigator who volunteered to participate. They were interviewed first to determine procedures to be followed with the sixth-grade students. The sixth-grade students, three good readers and three poor readers, were randomly selected from a group of students attending a middle-school in south central Wisconsin. The sixth-grade students were classified as good or poor readers by their reading teacher and on the basis of standardized test scores. All of the interviews were conducted in May of 1978, several weeks before the end of the school year.

The two seventh-grade students were asked to read the passage, stopping to describe the strategies they used to understand and study information in the text after (1) every independent clause, (2) points in the text where an analysis of the passage indicated students

might be expected to apply traditional types of comprehension skills (e.g., every 2-3 sentences), and (3) entire paragraphs of the text. The sixth-grade students read the same passage, stopping only after each paragraph of the text to describe their reading-study strategies.

Although the same passage was read by sixth-grade and seventh-grade students, the sixth-graders read a version of the passage in which sections had been rewritten so that they included (1) irrelevant or nonsensical information or (2) paragraphs in which sentences were presented in a scrambled order. The passage was divided into four sections of approximately the same length. Two of the sections consisted of paragraphs that had been disrupted in various ways (disrupted text), and two of the sections consisted of paragraphs that had not been disrupted (normal text). The disrupted sections were included in the passage to check on the accuracy of student responses by determining if students reported similar strategies when asked to read (1) the normal sections of the passage and (2) disrupted sections of the passage that presented comprehension difficulties.

Each paragraph of the passage was typed on a separate card, and students were asked to (1) read the passage silently, (2) stop at the end of each paragraph, and (3) describe the strategies they use to study and understand the information in the paragraph they had just read. A latin-square design was used to counterbalance the order in which students read normal and disrupted sections of the passage. After reading each paragraph, students were asked to respond to a general question about how they read and studied the text. Following

their response to the general question, the researcher asked unstructured probe questions to clarify students' initial responses or to get different kinds of information from the students.

Data Analysis and Results

Analysis of the seventh-grade students' responses indicated that they reported only paraphrases of the text content or global behaviors, such as rereading, when asked to describe their reading-study behaviors (1) after reading independent clauses or (2) at points in the text where they might have been expected to apply traditional types of comprehension behaviors. However, more explicit strategy descriptions were obtained when the students were asked to report their reading-study behaviors after reading entire paragraphs of the text. Although the researcher could infer reading-study strategies from the seventh graders' paraphrases of the text content, the purpose of interviewing students was to determine what students themselves said they did when asked to read for study purposes. Because the seventh-grade students described more explicit strategies after reading entire paragraphs in the passage, the sixth-grade students were only asked to describe their reading-study behaviors at the end of each paragraph of the text.

The researcher did not try to impose predetermined categories of reading-study strategies on the sixth-grade students' responses when she analyzed their protocols. Instead, the categories emerged as the researcher examined the student responses and began to label types of responses that were similar. Examination of the responses indicated that students talked about using types of strategies which the

researcher classified as either study strategies or comprehension strategies. Responses classified as study strategies included statements students made about (1) what they did to help themselves remember information in the passage (e.g., imaging, rehearsing), (2) their purposes for rereading portions of the passage, or (3) how they varied their reading rate in attempting to study and understand the information in the passage. Responses classified as comprehension strategies included statements students made about (1) how they figured out the meanings of words, sentences, and paragraphs in the passage, and (2) how they decided which information was or was not important to remember. Once all of the responses had been classified into categories of comprehension or study behavior, the researcher compared the categories of responses identified in the interviews to the skills listed by Mason, et al. (1977) and by Johnson and Barrett (in press).

Both good and poor readers were able to describe how they read and studied information in the passage. Good and poor readers differed, however, in the frequency with which they said they used particular types of strategies. Poor readers mentioned using study strategies such as "reflecting" and "reading slowly" more often than good readers, and good readers reported using comprehension strategies such as "identifying main ideas" and "identifying details" more often than poor readers. Most of the comprehension strategies identified in the study were similar to the types of skills identified by Mason, et al. (1977) and by Johnson and Barrett (in press). But students also talked about (1) relating new information they encountered in the text

to information they had read previously, (2) relating ideas in the text to information they already knew, and (3) using the context of the text to assign specific meanings to words with multiple meanings as well as using context clues to determine the meanings of unknown words.

While good and poor readers reported the same types of strategies for reading both normal and disrupted sections of the passage, reading the disrupted sections did tend to affect their responses when they read and studied normal sections of the passage. After reading the disrupted sections, students reported using more strategies when they read normal sections of the passage which followed a disrupted section.

Implications

From the results of the pilot study, the researcher concluded that (1) an introspective interview procedure could be used to identify good and poor readers' insights about the strategies they use to study and understand an expository passage, (2) the responses of students asked to read a disrupted text could be used to check on the accuracy of the types of strategies students say they use when asked to read a normal text, and (3) student responses could be classified into categories of reading-study behavior common to many instructional reading programs. Results of the pilot study suggest that (1) students gave more explicit strategy responses after reading entire paragraphs in the passage, and (2) students' responses in the normal sections of the passage increased after reading disrupted sections of the passage. The

increase in student responses after reading disrupted sections of the passage suggest that the disrupted sections had an instructive effect on the student responses when disrupted and normal sections were interspersed in the passage. These results were used in designing the actual study. Students were asked to describe their reading study strategies only after reading entire paragraphs in a passage and students were assigned to either a normal or a disrupted passage condition.

MATERIALS

The materials used in the study consisted of two versions of an expository passage and three types of measurement instruments.

The Expository Passage

The passage used in the study is about the Kalahari Desert of Africa. Information in the passage concerns the type of land and climate found in this desert as well as information about a group of nomads who live in the desert. The readability of segments of the passage, as measured by the Fry Readability formula, ranges between sixth- and eighth-grade reading levels. The passage has nine paragraphs, fifty-five sentences, 890 words, and 372 propositions (idea units). The propositions were derived from an analysis of the passage using Kintsch's (1974) prose representation system. The passage is a shortened and revised version of the text used in the pilot study. The passage was shortened and revised because the earlier version required over an hour and a half for students to read through it and

describe the strategies they used to study and understand the passage. A copy of the passage is in Appendix A.

Analysis of the passage using Meyer's (1974) adaptation of Grimes' (1975) semantic grammar of propositions indicated the information in the passage is primarily organized in an attributive (descriptive) organizational structure. The analyzed representation of the passage is in Appendix B. Bartlett (cited in Meyer, in press) recently surveyed textbooks used in junior high social studies classes and found that this type of structure was the most prevalent organizational pattern in the materials he surveyed.

A second version of the passage was written in which the logical or referential connectivity of the text was disrupted. Three basic types of disruptions were used:

- (1) Irrelevant or nonsensical details which disrupted the temporal or logical sequence of the ideas in a paragraph were imbedded in various paragraphs.
- (2) First and last sentences which did not introduce or summarize the rest of the sentences in a paragraph were placed at the beginning and end of various paragraphs.
- (3) The order of the original sentences in various paragraphs was scrambled so that the temporal or logical sequence of the ideas in the paragraph was disrupted.

To create the first and second types of disruptions, seven sentences and 82 words were added to the original passage. These additions represent a 10 percent increase in the number of sentences, a 9 percent increase in the number of words, and a 7 percent increase in the number of propositions in the disrupted text compared to the original version of the text. The first and third types of disruptions

are similar to the kinds of disruptions used by other researchers (Danner, 1976; Smirnov, 1973; Baker, 1979), and the second type was developed by the researcher to disrupt sections of the passage used in the pilot study. Every paragraph of the text contained at least one disruption, and each type of disruption occurred three times within the passage. A copy of the disrupted version of the passage is included in Appendix A. The disrupted version of the passage was used to obtain students' responses about their reading-study behaviors when they were asked to read texts which presented comprehension difficulties.

Measurement Instruments

Three types of measurement instruments were used in the study. One of the instruments was a questionnaire developed by the researcher to check on the strategies students said they used to study and understand the expository passage. The second instrument was a probed-recall test that was used to quantify the information students remembered after reading the passage, and the third instrument consisted of a set of criterion-referenced tests of comprehension skill development. The criterion-referenced tests were used to determine which students had or had not mastered the specific skills measured by the tests.

Questionnaire. The questionnaire was developed by the researcher to determine if students consistently reported using the strategies they said they used when asked to read the expository passage. The items in the questionnaire were constructed so that students could make "yes" or "no" responses to the question. The items were derived

from an analysis of the types of statements students in the pilot study made about their reading-study strategies as well as from items used in similar instruments that were developed by Myers and Paris (1978) and by Canney and Winograd (1979). The questionnaire includes nineteen questions about strategies students might use to study and understand, and five questions about such things as students' perceptions of themselves as readers, their perceptions about how easy or difficult the passage was to read, and their prior knowledge about the Kalahari Desert. A copy of the questionnaire is located in Appendix C.

Recall Test. Kintsch's (1974) prose analysis system was used to identify and represent the number of idea units in the text, and this analysis of the passage was used as a basis for scoring students' recall of information from the passage. Results of research by Kintsch and his associates (Kintsch, 1974; Kintsch, et al., 1975; Kintsch & van Dijk, 1978) indicate that his system can be used reliably for this purpose. A probed-recall test was used in the study because the researcher found that students in the pilot study remembered more information when they were asked to recall information about specific ideas in a passage than when they were asked simply to recall as much information as they could. According to Kintsch (1978), concepts that are repeated frequently within a representation of the microstructure of a text can be used as cue words in probed-recall tests, so the researcher selected cue words which represented ideas that are repeated frequently in the representation of the meaning of the text as well as

words that label concepts discussed in the first and last paragraphs of the text. These probe words are listed in Appendix D. The recall test was administered to determine how much information students remembered from the passage they read in the interview.

Criterion-Referenced Tests. Five subtests from Level F of The Wisconsin Tests of Reading Skill Development: Comprehension (WTRSD) were used to determine if mastery of specific comprehension skills could be predicted from the types of strategies students reported using to study and understand the passage. These tests were developed to measure students' mastery of the instructional objectives of the Wisconsin Design for Reading Skill Development: Comprehension (Otto & Kamm, 1977). The subtests from Level F of the WTRSD were used to assess students' mastery of the following skill-objectives:

(a) Identifies indirect context clues

Objective: The child determines the meaning of an unfamiliar word in a context which contains implicit (e.g., cause-effect, contrast, example, modifying phrase) and then applies that meaning in a second context where the same unfamiliar word appears but no implicit clues are present.

(b) Derives meaning from sentences

Objective: The child paraphrases complex sentences containing two or more prepositional phrases by re-arranging words and by substituting for more than a short phrase.

(c) Identifies central thought

Objective: The child identifies a central thought of a passage that contains no organizer (topic sentence) and has both relevant and irrelevant information.

(d) Identifies conclusions

Objective: The child identifies relationships that are indirectly stated in a passage and then determines whether given conclusions based on those relationships are right or wrong. (A relationship that is indirectly stated is one that requires synthesis of information from more than one statement.)

(e) Determines sequence

Objective: The child determines where a specific event occurs within the framework of a series of explicit events by attending to implicit sequential cues. (Otto & Kamm, 1977)

This level of the WTRSD was selected because (1) the skills assessed are representative of the skills identified by Mason, et al. (1977) and by Johnson and Barrett (in press) as types of skills common to many instructional reading programs and (2) an objective format is used in each of the five tests to assess skill attainment.

The WTRSD have been shown to be reliable instruments for assessing skill proficiency with students who have and students who have not received instruction using the Wisconsin Design for Reading Skill Development: Comprehension, and test statistics derived from large-scale tryouts of the tests are presented in Table 1. The internal-reliability coefficients for these tests range between .61 and .77. These reliabilities are lower than the .90-.95 reliability expected of longer, more general achievement tests, but the reliabilities of the five tests are considered relatively high for focused instruments such as the WTRSD (Kiepp, et al., 1978). Although parallel forms of the WTRSD comprehension tests are available, only tests from Form P were used in the present study.

TABLE 1

1977 COMMERCIAL EDITION OF WTRSD: COMPREHENSION
ESTIMATED SUMMARY STATISTICS FOR LEVEL F FORM P

Test	No. of Items	Raw Score	Std. Dev.	r	Percent Correct
1. Indirect Context Clues: Application	14	9.61	2.50	.61	68.64
2. Paraphrase: Preposi- tions	20	16.86	2.99	.76	84.30
3. Central Thought: Without Organizer	14	10.97	2.66	.74	78.36
4. Conclusions: Indirect Relationships	20	15.92	3.10	.71	79.60
5. Sequence: Implicit Cues	12	8.32	2.87	.77	69.33

SUBJECTS

Seventh-grade students from a middle-school in Verona, Wisconsin served as subjects in the study. Verona is a small suburban community near Madison, Wisconsin. Seventh-graders were selected because (1) results of research suggest that students of middle-school age are able to reflect on the strategies they use to study and understand prose materials, (2) students by this grade level were assumed to have had experience reading and studying expository materials, and (3) students by this level were assumed to have had some form of instruction in the basic types of skills developed in most elementary school reading programs.

The comprehension subtest of the Gates-MacGinitie Reading Test, Form E, was administered by the researcher to the entire seventh-grade class. The reading comprehension test was administered in January of 1980, and a total of 137 students was given the test. The raw scores from the test were converted to z-scores for the purpose of distinguishing between good and poor readers, and a stratified random sample of 22 good readers and 22 poor readers was selected to serve as subjects in the study. Students who achieved scores between $+1.80$ and $+1.75$ standard deviation units above the mean were classified as good readers, and students who achieved scores between $-.80$ and -1.75 standard deviation units below the mean were classified as poor readers.

Students whose z-score fell below -1.75 were not selected to serve as subjects because it was assumed by the researcher that their scores reflected an inability to comprehend the material used in the study. Students whose z-scores fell between $-.79$ and $+1.79$ were not selected as subjects to ensure that there was no overlap between students classified as good readers and students classified as poor readers.

A colleague of the researcher at the Wisconsin Research and Development Center for Individualized Schooling selected the students who participated in the study, and she randomly assigned the students to either the normal or the disrupted text condition. Another person selected the students who participated in the study to ensure that the researcher was blind to the reading ability status of the students who were interviewed.

PROCEDURE

The procedures of the study consisted of several steps. First, the researcher administered the comprehension subtest of the Gates-MacGinite Reading Test. The researcher then interviewed students to (1) obtain their responses about the strategies they used to study and understand, (2) obtain students' responses to the items in the questionnaire, and (3) administer the probed-recall test. Finally, the criterion-referenced tests of comprehension skill development were administered. The procedures related to the administration of the comprehension subtest of the Gates-MacGinite are described above under Subjects.

Conducting the Interviews

The data for the study were collected in February and March of 1980. Each student participating in the study was interviewed on an individual basis, and each interview was tape-recorded. The students were interviewed during their regularly scheduled reading class period, and each interview session was completed in approximately 50 minutes. The interviews were held in a quiet workroom located in the library of the school.

The interview sessions consisted of five activities or phases. The first phase involved establishing rapport and introducing the purposes of the study. In the second phase, the student was given instructions about how he was to proceed through the interview and an opportunity to practice the interview procedure. The third phase was the data collection phase in which the student was asked to

read the passage and describe the strategies he used to study and understand the passage. The fourth phase involved administering the questionnaire, and the fifth phase involved administering the probed-recall test.

Introduction to the Study. In the first phase of the interview session, the researcher encouraged the student to relax and explained the purpose of the interview. The researcher introduced herself, explaining that she was a student at the University of Wisconsin-Madison and that she was conducting the interviews as part of her studies at the university. Each student was told that the researcher was interested in learning what students do and what they think about when they read and study textbooks. The student was asked if he was willing to participate in the study, and every student who was selected agreed to participate.

The students were asked not to discuss what they did in the interviews with their classmates to ensure that they would not influence their classmates' responses. Most of the students seemed to take this precaution very seriously because students interviewed in subsequent sessions frequently mentioned that their classmates would not tell them what had happened when they were working with the researcher.

Instructions for the Study. The researcher discussed with the student the instructions on how to read and study the passage, and she described the activities that would follow the reading activity. Specifically, the researcher told each student that he would be asked to: (1) read a passage silently, studying the information for the

purpose of remembering as much as possible after reading; (2) stop at the end of each paragraph to describe what he did to study and understand the information in the paragraph; (3) answer questions about what he did to study and understand each paragraph; (4) answer questions about what he did to study and understand the whole passage; and (5) take a recall test. The researcher tried to make it clear to the student that there were no "right" or "wrong" answers involved in the procedure and that the purpose of the interview was to help the researcher understand more about how students read and study their textbooks.

Before the student began reading the passage, the researcher discussed some of the concepts that were essential to understanding the directions for the study. The student responded to the following questions:

1. What does it mean to understand what you read?
2. What does it mean to study for a test?
3. How is reading to study for a test different from other types of reading (e.g., reading a story, reading something you enjoy)?
4. What does it mean to pay attention to particular words or ideas when you read?

To help the student answer the first question, the researcher had the student read a short passage. Half of the sentences in the passage were simply random strings of words and half of the sentences in the passage were grammatical and semantically adequate sentences. The student was asked to tell the researcher which sentences he understood and why he did or did not understand each of the sentences.

The student was also encouraged to use this passage to help describe what paying attention to particular ideas meant. The passage (see Appendix E) was adapted by the researcher from two paragraphs used in the study reported by Canney and Winograd (1979).

The student was then given a practice paragraph to read silently. After reading the paragraph, he was asked to explain to the researcher what he did to study and understand the paragraph. Students who were assigned to the normal passage condition read a practice paragraph that had not been disrupted in any way, and students who were assigned to the disrupted passage condition read a practice paragraph that had been disrupted. Students who read the disrupted version of the passage were warned that because the paragraphs they were going to read had something wrong with them they would have to work a little harder to study and understand the information in the paragraphs. The practice paragraphs are in Appendix F.

Once the student had worked through the practice paragraph and the researcher had answered any questions about how to proceed, the researcher reemphasized that there were no right or wrong answers and that she was interested in the student's descriptions of what he thought about and did while reading and studying each paragraph in the passage.

Data Collection. Each of the nine paragraphs of the passage was typed on a separate page to ensure that the student would remember to stop reading at the end of each paragraph. The pages were stapled together. The student was asked to read each paragraph silently. When

he finished reading a paragraph, the researcher asked the student to answer the general question "What did you do to understand and study the _____ (e.g., first) paragraph?" As the interview proceeded, this question was varied with the question "How did you go about trying to understand and study the _____ (e.g., fifth) paragraph?" After the student had responded to the first question, the researcher asked a series of specific probe questions that were designed to get the student to clarify his response to the general question and to provide additional information about the student's knowledge of reading-study strategies. The general question and five probe questions, with alternatives, are listed in Table 2.

The researcher developed the probe questions by (1) examining probe questions used in the pilot study and selecting questions that seemed effective for helping students describe the strategies they used to study and understand, and (2) adapting probe questions that were used in studies reported by Meichenbaum, et al. (in press). The first two probe questions were designed to help the researcher score the students' responses to the general question and to help the students describe the strategies they used to study and understand the information in the paragraphs. The remainder of the probe questions were included to provide the researcher with an additional check on the accuracy of students' responses to the general question by having them discuss their knowledge about reading-study strategies in different ways. As the interviews proceeded, some of the students began to spontaneously provide answers to the probe questions; and often the

TABLE 2

INTERVIEW QUESTIONS: GENERAL QUESTIONS, PROBE
QUESTIONS, AND ALTERNATE QUESTIONS

General Question and Alternate

What did you do to understand and study the (1st) paragraph?

How did you go about trying to understand and study the (5th) paragraph?

Probe Questions and Alternates

1. Which ideas did you pay particular attention to?
 - a. What sentences or words did you pay particular attention to?
 - b. Which words or sentences did you not pay particular attention to?
 2. Why those ideas and not ... (the researcher points to a sentence not mentioned by the student)?
 3. Is there anything you should do when you study that you know you didn't do with that paragraph?

Is there anything you normally do when you study that you know you didn't do with that paragraph?
 4. What would a younger student have to know how to do to understand and study that paragraph?

What advice would you give someone else, for example a younger student, to help them study that paragraph?
 5. What would you do to write this paragraph again so that it would be easier to read or better?
 6. How do you think that would make it easier or better to read?
-

researcher had to ask students additional probe questions when she did not understand what students were saying exactly. For example, one student talked about picturing the ideas in her mind, and the researcher probed this response to be sure the student was describing an imaging strategy.

Once the student had read through the entire passage, the researcher read the items on the questionnaire to the student and recorded each response. The researcher explained that the items in the questionnaire were designed to check on the responses that the student had given when he read the passage and to provide the researcher with some additional information about the student's thoughts and feelings about reading. The student was instructed to respond with a "yes" or "no" answer to the questions unless a question called for choices like "easy" or "hard." When the student had completed the questionnaire, the researcher asked the probed-recall questions and tape-recorded the student's responses. The student was instructed to tell the researcher as much information as he could remember about each of the ideas from the passage the researcher asked about.

Administering the Criterion-Referenced Tests

One week after all of the interviews had been completed, the researcher and a colleague administered the criterion-referenced tests. The tests were given over a period of two days during the students' regularly scheduled reading class.

DATA ANALYSIS

The data for the study consisted of (1) responses students gave in the interviews about the strategies they used to understand and study the passage; (2) the number of responses each student gave about each category of reading-study behavior identified; (3) the students' responses to the items in the questionnaire; (4) students' scores on the recall test; and (5) students' scores on the criterion-referenced tests of comprehension skill development. The methods used to identify the types of strategies students said they used to study and understand the passage are presented before describing the manner in which the remaining data were analyzed.

Analysis of the Interview Protocols

The students' responses to both the general questions and the probe questions were analyzed to identify the types of strategies good and poor readers said they used when asked to read and study an expository passage. The researcher transcribed the interview tapes and assigned the responses to categories of reading and study behaviors. The categorized data were used to answer the first research question:

Research Question 1: What types of strategies do good and poor readers report using when they are asked to describe how they read and studied a normal text or a disrupted text?

As with the pilot data, categories were not imposed on the student responses. Instead the researcher began to apply descriptive labels as similar responses occurred within the protocols. New labels

were applied, or new categories added, when necessary. Each response that the researcher scored as a strategy response was underlined and a label was placed next to the response on the students' protocols.

A response was scored as a strategy if students said they had used the strategy to understand and study the information in the paragraphs they read during the interviews. Responses to the last five probe questions were not scored as strategy responses unless the students expanded on their initial responses. For example, in response to the third probe question, "Is there anything you normally do when you study that you know you didn't do with that paragraph?," some of the students said they normally took notes over information they read if they knew they were going to have a test on it. Even though the response indicates the students had knowledge of notetaking as a study strategy, they had not used this strategy to understand or study information in the passage they read in the interview. Such responses were not scored as strategy responses.

A complete description of the process of categorizing the responses and the specific categories identified are presented in answer to Research Question 1 in Chapter III. Four sample protocols with strategy responses underlined and labeled are presented in Appendix H. The protocols presented are representative of the protocols of good and poor readers who read either the normal or the disrupted version of the passage.

When all of the protocols had been scored and the strategy response underlined and classified, the researcher rescored each of the

protocols to be sure she had consistently applied the classification system. The researcher developed a score sheet for each student on which she listed all of the categories of reading-study behaviors identified in the study, and she listed the frequency with which a student reported using each of the strategies identified. Categories which had small frequencies were combined with other categories if it was logically possible to do so. For example, most students talked about assigning specific meanings to words with multiple meanings, but the absolute frequency with which this strategy was reported was small. Therefore, the researcher combined the students' responses in this category with the responses students gave about using contextual information in the passage to help them determine the meanings of unknown words. Both of these strategies represented statements students made about the way in which they used the general context of the passage to help them understand and study.

The researcher then scored each student's protocol to establish a measure of verbal fluency. The verbal fluency score represented the number of words each student said in the interview divided by the number of times the researcher asked the student probe questions. This measure of verbal fluency was used as a covariate in later stages of the data analysis.

Throughout the entire analysis procedure, the researcher was unaware of which students were classified as good readers and which students were classified as poor readers. After all of the interview protocols had been analyzed and all of the recall tests and

criterion-referenced tests scored, the researcher looked up each student's score on the comprehension subtest of the Gates-MacGinite Reading Test and labeled each protocol according to the reading ability status of the students.

To establish that the types of behaviors reported by good and poor readers were reliably categorized, two independent judges were asked to classify the responses in twenty protocols randomly selected from the protocols of good and poor readers in both the normal and disrupted text condition. The judges were not aware of the reading ability status of the students when analyzing the interview protocols. Kendall's coefficient of concordance was computed to determine the degree of agreement among the researcher's categorization of the student responses and the two judges' categorizations.

Analysis of the Questionnaire Responses and Test Score Data

The analysis of the students' responses to the items in the questionnaire is presented and then the analyses of the test score data are presented with the research questions which the analyses are designed to test.

Questionnaire Responses. Student responses to items in the questionnaire were analyzed by determining the frequency with which students said they used strategies when they read that were similar to strategy descriptions in the questionnaire. These frequencies were then compared to the frequency with which students said they used similar strategies during the interviews. The frequency scores were converted to percentages and are presented in tabular form.

Research Question 2. The second research question concerns differences in the frequency with which good and poor readers reported using the types of reading-study strategies identified in the study. Because of the exploratory nature of this study, Research Question 2 was translated into a statistical hypothesis of no difference.

Statistical Hypothesis 1: Good and poor readers do not differ in the frequency with which they report using particular reading-study strategies when they are asked to read a normal or a disrupted text.

To test this hypothesis, the researcher counted the number of times each student reported using specific types of reading-study strategies. Examination of the observed frequencies within each category indicated that the scores were not normally distributed. Thus, for each of the categories of behavior reported, three planned comparisons were computed, using the Kruskal-Wallis model of analysis of variance by ranks (Marascuilo & McSweeney, 1978). Each student's frequency scores were replaced by ranks and the rank scores served as the dependent variables in each of the analyses performed. These comparisons are analogous to the type of analysis that would have been performed had the researcher used a standard two-way analysis of variance test with type of reader (good and poor) crossed with type of text (normal and disrupted). The comparisons for the analyses performed are shown on the following page.

Since eleven types of strategies were identified in the study, eleven of these comparisons were computed. The comparisons were computed to determine if: (1) good and poor readers who read the disrupted version of the passage differed in the frequency with which

Comparison	Coefficient	
	Disrupted Text	Normal Text
ψ_1	$(R_1 - R_2)$	
ψ_2		$(R_3 - R_4)$
ψ_3	$(R_1 + R_2)$	$- (R_3 + R_4)$

they reported using a strategy; (2) good and poor readers who read the normal version of the passage differed in the frequency with which they reported using a strategy; and (3) students who read the disrupted and normal versions of the passage differed in the frequency with which they reported using a strategy.

Research Question 3. The third question addressed differences between the amount of information recalled by students who frequently reported using reading-study strategies and students who infrequently reported using reading-study strategies. This research question was also translated into a statistical hypothesis of no difference.

Statistical Hypothesis 2. Students who frequently report using reading-study strategies will not differ in the amount of information they recall from students who infrequently report using reading-study strategies.

A median-split procedure was used to divide the students into two groups, students who frequently reported using reading-study strategies and students who infrequently reported using reading-study strategies. The researcher duplicated the copy of the passage in which she had

analyzed the information in the text into propositions using Kintsch's (1974) representation system. She then compared the information recalled by the students to the propositions from the text, marking each proposition which the student had recalled verbatim or had recalled in a paraphrased form. The number of propositions each student recalled was then determined. An analysis of covariance was computed in which the dependent variable was the total number of propositions each student recalled, and the covariate measure was the students' verbal fluency score (see p. 82).

To determine if the researcher had reliably scored the students' recall tests, a judge who was familiar with Kintsch's (1974) system for scoring recall protocols was asked to score independently twelve of the students' recall protocols. Six of the recall protocols were randomly selected from the protocols of students who frequently reported using reading-study strategies, and six of the protocols were randomly selected from the protocols of students who did not frequently report using reading study strategies. A Pearson product-moment correlation coefficient was then computed to determine the degree of agreement between the examiner's and the judge's scoring of the students' recall tests.

Research Question 4. The fourth research question relates to whether the strategies students said they used could be used to predict mastery or non-mastery of the set of criterion referenced tests of comprehension skill development. Again, a statistical hypothesis of no difference was established.

Statistical Hypothesis 3. The frequency with which students report using particular categories of reading-study strategies when asked to read a normal and a disrupted text cannot be used to predict mastery or non-mastery of a set of criterion-referenced tests of comprehension skill development.

Students' scores on the five individual tests administered were combined into a total (composite) score representing their cumulative number of correct responses on the five tests. Students were classified as "Masters" if they correctly answered 64 (80 per cent) of the items on the tests, and this score was used to determine if mastery, as here defined, could be predicted from the strategies students said they used. A score of 80 per cent correct was adopted as a cut-off score as this level of accuracy is commonly used in many commercial criterion-referenced tests (Johnson & Pearson, 1978). The data were analyzed using the discriminant analysis procedure that is part of the Statistical Package for the Social Sciences (Nie, et al., 1975). Only the types of strategies that were reported by over 30 per cent of the students were used in this analysis procedure.

The independent variables in the analysis were students' frequency scores in four of the categories of reading-study behavior identified. These frequency scores served as discriminating or predictor variables in the discriminant classification procedure, and they were analyzed to determine if the frequency with which students described using four categories of reading-study behavior could be used to predict students' classification as Masters or Non-masters of the set of criterion-referenced tests.

CHAPTER III

RESULTS AND DISCUSSION

The present study was exploratory in the sense that it was designed to (1) identify the strategies students said they used to study and understand an expository text, and (2) relate the strategies students reported using to types of basic comprehension skills taught in many elementary school reading programs and to a recall test and criterion-referenced tests of comprehension. This chapter presents the results and discussion related to each of the research questions posed.

RESEARCH QUESTION ONE

The first research question concerns the types of strategies students said they used to study and understand an expository passage. Forty-four seventh-grade students, twenty-two good readers and twenty-two poor readers, were interviewed to obtain descriptions of how they read and studied a normal or a disrupted version of the passage used in the study. The students' interview protocols were analyzed to answer the first research question:

Research Question 1. What types of strategies do good and poor readers report using when they are asked to describe how they read and studied a normal text or a disrupted text?

To answer this question, the researcher first transcribed the students' tape-recorded responses to the interview questions and then analyzed each of the interview protocols to classify the responses into

categories of reading-study behavior. After all of the protocols had been analyzed, the researcher determined the number of responses that were obtained in each category and combined some of the categories of responses to create new categories. The new categories were created so that the responses were grouped into categories that could be analyzed statistically. Sixteen categories of responses were identified initially, but five of the categories contained only 6 to 15 responses. These responses were combined to create new categories, for a total of eleven categories of reading-study behavior. In this section, each of the categories is described and examples of the types of responses included in each category are presented. Estimates of the reliability with which students' responses were assigned to categories of reading-study behavior are also presented, and students' responses to the items in the questionnaire are reported.

Category One

Category one includes statements students made about using contextual information in paragraphs to help them understand and study. Students talked about using context in three ways: (1) using information in the passage to determine the meanings of unknown words; (2) using information in the passage to assign a specific meaning to words with multiple meanings; and (3) using information in the passage to comprehend information that was not understood initially. Examples of responses assigned to this category are presented in Table 3.1. Each example in the table illustrates types of responses given to the general question "What did you do to understand and study paragraph ___?"

The examples include responses that were classified into other categories, and only the underlined statements represent responses assigned to Category One.

TABLE 3.1

EXAMPLES OF RESPONSES ASSIGNED TO CATEGORY ONE

Good Reader-Normal Text: Paragraph 6

"Well, I read it a couple of times, and then I tried to understand the harder words, like migrate and nomads."

(PROBE QUESTION: What did you do to understand those words?)

"Well, you look at the context of the sentence and see what surrounds it. So like 'they don't stay in one spot' that sort of means that they have to move. And nomads, I just thought that was probably the name of what they were for moving from place to place."

Poor Reader-Normal Text: Paragraph 4

"Well, I had to read it slow so I could catch the first part and understand what it meant."

(PROBE QUESTION: What do you mean by "First part?")

"In March the drought or dry time returns." I really didn't understand what they said in the paragraph, and then when I went back, I saw that they said drought and gave the meaning for it."

Good Reader-Disrupted Text: Paragraph 9

"Well, I went through and picked out the words that I didn't really understand or hadn't heard very often before, like 'band.' I hadn't heard it used that way before, and like rubber band, sure, but not like bands of people, like a group of people."

Category Two

Responses assigned to Category Two include statements students made about how they identified important ideas in paragraphs by (1) reading all of the sentences and noting frequently repeated words, and (2) reading the first sentence of a paragraph and predicting the topic of most of the other sentences in the paragraph. Examples of the types of responses that were classified into Category Two are shown in Table 3.2. The first example was included to show how responses to probe questions could be used to help assign responses to the general question and first two probe questions to specific categories.

Category Three

Responses classified in Category Two indicated that students identified important ideas in some of the paragraphs on the basis of the most frequently repeated words. Responses assigned to Category Three, however, indicated that students also identified important ideas in paragraphs on the basis of how the ideas were grouped or related in paragraphs. Responses assigned to this category include statements students made about (1) identifying the main topic of a paragraph as well as groups of ideas that related to that topic, and (2) dividing a paragraph into groups of related ideas. Examples of responses assigned to Category Three are presented in Table 3.3.

Category Four

The responses that were assigned to Category Four include

TABLE 3.2
EXAMPLES OF RESPONSES ASSIGNED TO CATEGORY TWO

Poor Reader-Normal Text: Paragraph 5

"I just kind of looked at it, And first, I picked out the subject it was mostly talking about. And I kind of read that so I could understand."

(PROBE QUESTION 1: Which ideas or sentences did you pay particular attention to?)

"People called Bushmen."

(PROBE QUESTION 2: Why those ideas and not the last sentence?)

"Cause, if they just said that you wouldn't know who was hunting."

(PROBE QUESTION 4: What would a younger student have to know how to do to study and understand that paragraph?)

"First, they'd have to figure out that people called Bushmen... Well, I'd just tell them to read it over and pick out the main subject."

(PROBE QUESTION: Is there any clue you could give a younger student so that they'd know how to pick out the subject of a paragraph?)

"Well, what it mostly talks about. Like it mostly talks about the Bushmen."

Good Reader-Normal Text: Paragraph 4

"Well, you know, in the first sentence it says the drought, so I assumed that was probably what it was going to be about, the whole paragraph. And that's about what the whole paragraph is about."

Good Reader-Disrupted Text: Paragraph 4

"I skimmed it and then I read it."

(PROBE QUESTION: How does skimming and then reading help?)

"Well, I find what it's mainly about by skimming and seeing what some of the main words are and stuff. Like if some words are repeated. And then reading, then I look for the things I saw when I skimmed."

(PROBE QUESTION 1: Which ideas did you pay particular attention to?)

"The first one because it seemed like that was what a lot of it was about."

TABLE 3.3

EXAMPLES OF RESPONSES ASSIGNED TO CATEGORY THREE

Good Reader-Normal Text: Paragraph 4

"Well, it seemed to be divided into three sections. The different parts, like the drought, and when they were just starting to get all muddy, and then they would finally all dry up. And I started each of them separately and then re-read them before I went to the next one."

Poor Reader-Normal Text: Paragraph 2

"Well, some of the information, like I just divided it up into groups, like first the baobab tree, and the seeds, into groups like that."

(PROBE QUESTION: How did you know to divide it into groups?)

"You could tell from what it was talking about and some of the important words that were in the sentences."

(PROBE QUESTION: Can you give me an example?)

"The trees, the thick branches. The roots, the seeds, stuff like that."

(PROBE QUESTION 2: Why those ideas and not the first sentence?)

"Because all of them pretty much talked about one thing, and the first sentence, talked about it but not as specific as the other sentences."

Good Reader-Disrupted Text: Paragraph 2

"Well, I previewed. And there was a lot of stuff that was important so I went over it and I changed it into three basic ideas."

(PROBE QUESTION: What were they?)

"There aren't very many really big plants, most of them are just dry grasses and stuff. Then there's the baobab tree and there's a lot of stuff about that. Then they're talking about how the seeds...seeds didn't even grow at times. They just waited until the rain came, cause you had to have rain."

statements in which students related the information in the text to their prior knowledge or experience. Students talked about using prior knowledge to (1) decide on the ideas they paid attention to, and (2) help them understand and study information they read. Students talked about using prior knowledge in three ways. One of the ways in which they related the information in the text to their prior knowledge or experience was by using ideas from paragraphs they had read previously in the passage to help them study and understand information in subsequent paragraphs in the passage. Examples of these types of responses are presented in Table 3.4a.

A second way in which students talked about using prior knowledge to help themselves study and understand was by contrasting

TABLE 3.4a

EXAMPLES OF RESPONSES ASSIGNED TO CATEGORY FOUR

Good Reader-Disrupted Text: Paragraph 7

"Now in this first sentence it started talking about the Bushmen again. And we'd already gone through how they lived and where they lived, and so I thought the next thing we'd be thinking about would be about the eating... but...it was talking about what they do in a place where food and water can be found."

Good Reader-Normal Text: Paragraph 6

"The part about the nomads. I know exactly what nomads do and how they move. And because of all the stuff in paragraphs 1-5 those are all the reasons for this."

information in the text with information they already knew. This kind of statement was given primarily in response to the first or second probe questions. The probe questions and examples of responses are given in Table 3.4b.

The third way students talked about using prior knowledge was to compare the ideas they read in the passage with information they already knew. This type of response also followed the first or second probe questions. Examples of responses in which students compared information in the text to their prior knowledge or experience are given in Table 3.4c.

Category Five

The fifth category includes responses in which students said

TABLE 3.4b

EXAMPLES OF RESPONSES ASSIGNED TO CATEGORY FOUR

Poor Reader-Disrupted Text: Paragraph 9

(PROBE QUESTION 1: Which ideas did you pay particular attention to?)

"The one about where other people cannot walk into one person's bands, territory."

(PROBE QUESTION 2: Why that idea and not the first sentence?)

"Well, because that one struck me as sort of different because usually, if you...you might cut through somebody's yard to get...to make it shorter even if you really didn't know them...If you didn't trample it or ruin any flowers, they probably wouldn't mind you coming through the yard. And here, it's like you can't walk onto another person's territory without being shot."

Good Reader-Normal Text: Paragraph 3

(PROBE QUESTION 1: Which ideas did you pay particular attention to?)

"That the desert doesn't have rain for about ten months in the year and that they have rain during the months that we generally have snow. Which is kind of surprising. But they're nearer the equator so it makes sense. Then it says, like when the rains fall, it starts becoming all green and all the flowering plants come out. But when the winter's up here...you know, you just kind of compare them because we don't have anything but snow or sometimes brown grass."

TABLE 3.4c

EXAMPLES OF RESPONSES ASSIGNED TO CATEGORY FOUR

Good Reader-Normal Text: Paragraph 9

(PROBE QUESTION 1: Which ideas did you pay particular attention to?)

"The second to the last sentence, about giving permission to enter another's territory. That reminds me of like... I live in the country and you have to have permission to go hunting on somebody's land or something like that. So it just gives you kind of an idea of what it's like because you know what it's like."

Good Reader-Normal Text: Paragraph 1

"Well, like I read over it once really quickly and then the stuff that you know, you just take for granted, I mean like the stuff about the vegetation...you know about that for every desert. And so that's going to be the same. But then the stuff, like it's in southwestern Africa and covered three nations and the Kalahari Desert, you want to make sure and remember that because that's the title."

Poor Reader-Normal Text: Paragraph 2

(PROBE QUESTION 1: Which ideas did you pay particular attention to?)

"Like it says a 200-foot b.. (baobab) babab tree and it says like its thick branches reach like stretching arms into the sky. So I think it's like one of the willow trees."

Poor Reader-Disrupted Text: Paragraph 5

"Trying to think about what I learned in the past about like Bushmen, and stuff like that."

(PROBE QUESTION: Have you studied about Bushman before?)

"Well, we learned like in Australia, those guy...the aborigines..."

they paid attention to particular ideas or sentences either because the information in the sentences stated a cause or an effect of other information in a paragraph. The example in Table 3.5 represents the types of statements that were assigned to this category.

TABLE 3.5

EXAMPLES OF RESPONSES ASSIGNED TO CATEGORY FIVE

Poor Reader-Normal Text: Paragraph 6

"That last sentence cause they're talking about nomads and Bushmen travel from place to place cause there's no waterholes. That's why they're called nomads."

(PROBE QUESTION 2: Why that sentence and not the sentence that begins, "Instead, they gather...?")

"Because...Well, they move from place to place because the roots, nuts, and animals don't live there anymore because there's no water and stuff."

Category Six

Three types of statements that relate to strategies students said they used to study and remember information in the passage are included in Category Six. The responses assigned to this category include statements students made about (1) predicting test questions, (2) imaging, and (3) self-questioning. Responses of these types were combined into a single category because the

frequency with which students described using these strategies was quite low.

TABLE 3.6

EXAMPLES OF RESPONSES ASSIGNED TO CATEGORY SIX

Poor Reader-Normal Text: Paragraph 3

"By reading through it and by picking out like December, January, and February, when it rains."

(PROBE QUESTION 2: Why those ideas and not the sentence that begins, "Flowering plants...?"

"Because the flowering plants adding bright colors wouldn't really matter on a test."

Good Reader-Disrupted Text: Paragraph 3

"Well, I just read through it and I was thinking pictures in my mind of what it would look like...If you can picture it, you know, then you probably would remember it better."

Good Reader-Disrupted Text: Paragraph 3

"First I read it, and I asked myself questions about the stuff. And picked out the main idea.

(PROBE QUESTION: What kind of questions did you ask yourself?)

"Well, like 'How long is the desert without rain?'"

Category Seven

The seventh category includes students' descriptions of how they read the text using a skimming strategy. The responses that

were classified as skimming strategies were statements in which students said they (1) read a paragraph slowly, and (2) skimmed or rapidly read through a paragraph and then reread the paragraph more slowly and carefully.

TABLE 3.7

EXAMPLES OF RESPONSES CLASSIFIED IN CATEGORY EIGHT

Good Reader-Normal Text: Paragraph 6

"Well, looked around, and I kind of...Well, first I quick skim read it, and then I read it over, like each sentence, just reviewing the sentences. And then I read it over one final time."

Good Reader-Normal Text: Paragraph 1

"I read each sentence really slowly, then I skimmed over the paragraph again."

(PROBE QUESTION: How did skimming help you?)

"It helps me remember the facts that I learned."

Category Eight and Category Nine

Responses assigned to Category Eight were statements students made about reading paragraphs more than once without mentioning whether they varied the rate at which they reread. Responses in this category include statements students made about rereading to help themselves (1) remember information, or (2) comprehend information they had failed to understand the first time they read it.

Responses assigned to Category Nine often preceded or followed statements students made about rereading. Responses included in this category consisted of statements students made about not understanding information in the passage. Examples of responses included in Category Eight and Category Nine are presented in Table 3.8. The first example is a statement assigned to Category Eight, and the second example is a statement assigned to Category Nine.

TABLE 3.8

EXAMPLES OF RESPONSES ASSIGNED TO CATEGORIES EIGHT AND NINE

Poor Reader-Normal Text: Paragraph 5

"Reading it over...sort of going over some of the parts that I thought were important."

Poor Reader-Disrupted Text: Paragraph 3

(PROBE QUESTION 1: Which ideas did you pay particular attention to?)

"The animals of the Kalahrai graze on the new, tender plants, that sentence."

(PROBE QUESTION 2: Why that sentence...(student interrupts))

"Because I didn't get that sentence. I mean, the animals, I don't know. It just didn't make sense to me. So I read it over."

Category Ten and Category Eleven

Responses assigned to Categories Ten and Eleven include responses students made which were too vague or global to classify

into any of the categories previously mentioned. Responses assigned to Category Ten were statements students made about identifying important ideas and selecting ideas to pay attention to without specifying clearly or explicitly the strategy they used for these purposes. Responses assigned to Category Eleven were statements in which students said they read slowly and carefully to help themselves study and understand as well as statements in which students said they concentrated and paid attention to help themselves study and understand. Several examples of responses from Categories Ten and Eleven are presented in Table 3.9. The first two examples represent statements that were assigned to Category Ten, and the last two examples represent statements that were assigned to Category Eleven.

Reliability of Classification Procedure

Two independent judges classified the responses in twenty protocols using the categorization system developed by the researcher. The protocols scored by the judges were randomly selected from the protocols of good and poor readers in both the normal and disrupted text condition. A Kendall's coefficient of concordance was computed to determine the degree of agreement among the researchers' categorization of student responses and the two judges' categorizations. A .84 Kendall Coefficient of Concordance was obtained among the researcher's and the two judges' categorizations, indicating that the researcher had reliably classified student responses into categories of reading-study behavior.

TABLE 3.9

EXAMPLES OF RESPONSES ASSIGNED TO CATEGORIES TEN AND ELEVEN

Poor Reader-Disrupted Text: Paragraph 2

"I read it slow and picked out specific, like nouns, you know. Like desert plants, that's a noun and that's part of a sentence."

(PROBE QUESTION 1: Which ideas did you pay particular attention to?)

"It's talking about plants, and rain."

(PROBE QUESTION 2: Why those ideas and not the last sentence?)

"I don't know."

Poor Reader-Normal Text: Paragraph 4

(PROBE QUESTION 1: Which ideas did you pay particular attention to?)

"Like when they, like they become slippery mud and caked with earth. The exciting ones, you know."

(PROBE QUESTION 2: Why that sentence and not the first sentence?)

"Well, this sounds...it probably doesn't have nothing to do with the sentence, but it's when I read it, it sounds more exciting, you know."

Poor Reader-Normal Text: Paragraph 8

"Well, it was long so I put my mind to it...I put out everything in the room and I just concentrated on that."

Good Reader-Disrupted Text: Paragraph 2

"I...just tried to read it slower and think about it when I was doing it."

(PROBE QUESTION: How does reading slower help?)

"Then you can like interpret which words...what it means. And you know, find out what the sentences are really saying. Not just read it quick through and not know what you just read."

Questionnaire Responses

Student responses to items in the questionnaire were examined to see if students reported using the same strategies after reading as they had during the interviews. Table 4 presents the percentage of students who said after reading that they used strategies like the ones described in the questionnaire as well as the percentage of students who described using similar strategies as they read the passage.

The researcher had developed the items in the questionnaire by analyzing responses obtained in the pilot study and by adapting items from similar questionnaires used by other researchers. After the interview protocols had been analyzed, however, it became apparent that the items in the questionnaire contained many less explicit strategy descriptions than the descriptions students actually gave during the interviews, making it difficult to meaningfully interpret this data. For example, while 93% of the students said they remembered interesting ideas more than other ideas (Question 6) after reading, only 41% of the students talked about

TABLE 4
PROPORTION OF STUDENTS WHO REPORTED USING SIMILAR STRATEGIES
DURING AND AFTER THE INTERVIEWS

Question	% Reported After Interview	% Reported During Interview
1. Did you try to remember the ideas in the passage word for word?	25	0
2. Did you try to "sound out" unfamiliar words to help you understand them?	82	0
3. Did you ever reread anything in the passage?	98	98
4. Did you reread to help you remember information?	91	80
5. Did you reread because you didn't understand something?	77	65
6. Did you remember ideas that were interesting to you more than others?	93	41
7. Did you ever ask yourself questions about what you read?	52	22
8. Did you use information (ideas) from the first part of the passage to help you understand information (ideas) in later parts of the passage?	64	52
9. Did you look for important ideas while you read?	98	86
10. Did you look for one sentence that stated the most important idea in a paragraph when you read?	64	75

11. Did you look for ideas that might be on a test when you read?	93	39
12. Did you try to understand information that was new to you by comparing it to something you already know?	82	79
13. Did you repeat ideas in your mind to help you remember them?	91	0
14. Did you get pictures in your mind when you read?	75	19
15. Did you read some of the paragraphs more slowly than others?	93	45

looking for interesting ideas as a way to study and understand the passage. Responses like these were classified in Category Ten because they were less explicit descriptions of how students identified important ideas in the passage than strategies classified into Categories Two and Three. Moreover, some of the items in the questionnaire simply did not match the types of strategies students reported. For example, Question Two was an item adapted from a questionnaire used by Myers and Paris (1978) to determine if younger students and older students differed in their conceptions of reading. Seventh-grade students who participated in this study did not talk about using decoding or "sounding out" word strategies themselves, but they frequently said in responses to the fourth probe question that younger students would have to be able to sound out words in the passage if they were reading it on their own. Thus,

it is not clear whether students actually used decoding strategies as a way to study and understand the passage but did not report them, or whether they responded to the second question on the basis of their knowledge that reading involves decoding unfamiliar words.

Discussion and Summary

Analysis of the interview protocols indicated that students' descriptions of how they read and studied an expository passage could be classified reliably into eleven categories of reading-study behavior:

1. Category One -- Uses contextual information in paragraphs to (a) determine the meanings of unknown words, (b) assign a specific meaning to words with multiple meanings, and (c) comprehend information that was not initially understood.
2. Category Two -- Identifies important ideas in paragraphs by reading (a) all of the sentences and determining which idea is the topic of most of the sentences in a paragraph and (b) the first sentence and predicting the topic of most of the other sentences.
3. Category Three -- Identifies important ideas in paragraphs by (a) identifying the topic of the paragraph as well as groups of ideas related to the topic and (b) dividing the ideas in paragraphs into groups of related ideas.
4. Category Four -- Uses prior knowledge to understand and study by (a) relating information in a paragraph to ideas read in previous paragraphs, (b) contrasting the ideas in a paragraph with prior knowledge and experience and (c) comparing the ideas in a paragraph to prior knowledge and experience.
5. Category Five -- Identifies sentences that are cause or effects of other information in a paragraph.
6. Category Six -- Predicting test questions, imaging, or self-questioning to understand and study information in a paragraph.

7. Category Seven -- Reading a paragraph slowly and then rereading the paragraph at a rapid rate or reading a paragraph rapidly and rereading the paragraph at a slow or careful rate.
8. Category Eight -- Reading information in paragraphs more than once to be able to remember the information or to overcome comprehension failures.
9. Category Nine -- Noting when comprehension has or has not occurred.
10. Category Ten -- Identifying important ideas in a paragraph on the basis of personal reactions or idiosyncratic strategies.
11. Category Eleven -- Reads a paragraph slowly to study and understand or concentrates on the ideas in a paragraph to study and understand.

The skills Mason, Osborn, and Rosenshine (1977) and Johnson and Barrett (in press) identified as skills common to reading methods texts and instructional materials used to teach reading in the elementary grades are summarized in Table 5

TABLE 5

SKILLS COMMON TO MANY INSTRUCTIONAL READING PROGRAMS*

1.	Locating Details**
2.	Understanding Words in Context
3.	Recognizing a Sequence of Events**
4.	Recognizing Cause and Effect Relationships**
5.	Comparing and Contrasting**
6.	Recognizing the Main Idea/Title/Topic**
7.	Drawing Conclusions and Predicting Outcomes

*The skills presented in Table 5 are the skills listed by Mason, et al (1977). The asterisks indicate that the same skill or a similar skill was also listed by Johnson and Barrett (in press).

Comparison of the skills listed in Table 4 and the categories of strategies students said they used to study and understand an expository passage indicate that students talked about using five types of skills common to many instructional reading programs. Students talked about: (1) understanding words in context (Category One), (2) recognizing main ideas (Category Two and Three), (3) locating details (Category Three), (4) comparing and contrasting (Category Four), and (5) recognizing cause and effect relationships (Category Five). Responses that were classified in Categories Six and Seven are similar to types of reading-study skills commonly described by reading educators (Brown, in press) in that students talked about self-questioning and skimming strategies as ways to understand and study information. Even though Johnson and Barrett (in press) list "Study Skills" as one of the categories of skills common to the instructional materials they examined, it is not clear which particular study skills they identified. Nevertheless, responses included in Categories Six and Seven indicate that students are aware of how various study strategies such as imaging, self-questioning, and skimming can be used to study and understand printed materials. Based on these comparisons, it was concluded that students did talk about using reading-study strategies that are similar to the types of comprehension skills that are commonly found in instructional materials used to teach reading in the elementary grades.

Both Mason, et al (1977) and Johnson and Barrett (in press) list recognizing a sequence of events as a skill common to the

instructional reading materials and reading methods texts they examined; however, this particular skill was not described by students participating in this study. The passage used in the study was not organized around a sequence of events as are narrative or story materials, and students had no reason to talk about this skill. Students did attend to the organizational patterns within some of the paragraphs, and responses which reflected students' awareness of the organizational features of the text were classified into Category Three. Responses included in Category Three are similar to the type of grouping strategy students described in the study reported by Smirnov (1973).

Students also did not talk about drawing conclusions and predicting outcomes. In many instructional reading programs used in the elementary grades, these skills are developed in materials that have narrative structures or action-event sequences, and the activities used to teach the skills require students to (1) draw conclusions about such things as the moral of a story or (2) predict the outcome of a particular action-event sequence. The passage students read in the study, however, was an expository text which did not lend itself to these types of skill activities.

Students did talk about predicting the main idea of paragraphs, and this type of response was included in Category Two. Students' descriptions of this strategy indicated that they used the first sentences in paragraphs to predict the main idea of a paragraph, and then read the paragraph to see if their prediction was or was not

confirmed. This type of strategy is similar to the strategy Olshavsky (1976-1977) labeled "Hypothesis" in her study except that in Olshavsky's study the responses classified as hypothesis strategies referred to predictions students made about events that would occur in stories. In this study, students used the first sentence to set up expectations about topics that would be discussed in paragraphs, and students' descriptions of this strategy reflect the common practice of having students look for topic sentences at the beginning of paragraphs as a way to identify main ideas.

Responses classified in Category Nine are similar to the strategy Olshavsky (1976-1977) called "Stated Failure to Understand," and responses she classified in this category included statements students made about not understanding information in the passages they read. Responses of this type are similar to one of the comprehension-monitoring skills Brown (in press) describes in that statements included in Category Nine reflect students' awareness of when they had not understood information they read in the passage.

RESEARCH QUESTION TWO

The second research question addressed differences in the frequency with which good and poor readers said they used the eleven types of strategies identified in the study. The research question was translated into a statistical hypothesis of no difference:

Statistical Hypothesis 1. Good and poor readers do not differ in the frequency with which they report using particular reading-study strategies when they are asked to read a normal or a disrupted text.

The results of analyses performed to test this statistical hypothesis are presented in this section.

Results

The mean frequency with which good and poor readers reported using each type of strategy is shown in Table 6.

Examination of the distribution of the frequency scores within each category indicated that the scores did not appear to be normally distributed; thus, three planned comparisons were computed for each of the eleven categories of reading-study behaviors identified, using the Kruskal-Wallis model of analysis of variance by ranks (Marascuilo & McSweeney, 1977). The frequency scores in each category were converted to rank scores and the planned comparisons were computed to determine if: (1) the mean rank score of good readers who read the disrupted version of the passage differed from the mean rank score of poor readers who read the disrupted version of the passage; (2) the mean rank score of good readers who read the normal version of the passage differed from the mean rank score of poor readers who read the normal version of the passage; and (3) the mean rank score of students who read the normal version of the passage differed from the mean rank score of students who read the disrupted version of the passage. Each comparison was tested at the .05 alpha level of significance, as in a standard analysis of variance procedure. The mean rank scores of good and poor readers who read the disrupted or the normal version of the passage are presented in Table 7.

TABLE 6

MEAN NUMBER OF STRATEGY RESPONSES REPORTED BY GOOD AND POOR READERS
ASSIGNED TO THE NORMAL OR DISRUPTED TEXT CONDITION

Categories	Disrupted Text		Normal Text		Total
	Poor Readers	Good Readers	Poor Readers	Good Readers	
Category One	1.54	3.36	2.72	3.81	2.86
Category Two	1.45	3.72	1.45	3.27	2.47
Category Three	1.27	2.90	1.45	1.81	1.86
Category Four	1.18	2.90	3.72	5.00	3.20
Category Five	0.54	1.09	0.90	1.18	0.93
Category Six	1.36	2.45	1.09	1.81	1.68
Category Seven	1.54	2.63	1.63	2.72	2.13
Category Eight	2.45	.70	.90	.63	1.18
Category Nine	.90	.36	.81	.54	.65
Category Ten	.63	1.09	2.54	1.45	1.43
Category Eleven	1.90	0.81	1.81	.72	1.31

TABLE 7

MEAN RANK SCORES OF STRATEGY RESPONSES BY GOOD AND POOR READERS
ASSIGNED TO THE NORMAL OR DISRUPTED TEXT CONDITION

Category	Disrupted Text		Normal Text	
	Poor Reader	Good Reader	Poor Reader	Good Readers
Category One	13.82	26.55	21.27	28.36
Category Two	17.14	28.00	16.86	28.00
Category Three	16.64	30.50	20.23	22.64
Category Four	13.64	22.27	22.32	31.77
Category Five	17.55	24.91	22.23	25.32
Category Six	21.86	25.64	17.14	25.36
Category Seven	18.41	25.68	19.27	26.64
Category Eight	27.68	21.23	21.23	19.86
Category Nine	23.86	17.86	25.45	22.82
Category Ten	19.50	20.82	28.86	20.82
Category Eleven	26.50	19.91	24.09	19.50

The z-scores obtained in each of the analyses performed are presented in Table 8. Results indicated that statistically significant differences were obtained between groups in four of the eleven categories of reading-study behavior identified.

Category One. No significant differences were obtained in Category One between the mean rank scores of good and poor readers

TABLE 8

Z-SCORES OBTAINED IN EACH OF THE COMPARISONS PERFORMED

	<u>Disrupted Text</u>	<u>Normal Text</u>	<u>Type of Text</u>
	Poor Reader vs. Good Reader	Poor Reader vs. Good Reader	Normal vs. Disrupted
Category One	2.35*	1.31	-1.21
Category Two	2.01*	2.06*	0.04
Category Three	2.58*	0.45	0.56
Category Four	1.59	1.74	-2.37*
Category Five	1.44	0.60	0.70
Category Six	0.71	1.55	0.66
Category Seven	1.38	1.40	0.24
Category Eight	1.29	0.27	1.11
Category Nine	1.25	0.54	-0.96
Category Ten	0.26	1.56	1.29
Category Eleven	1.32	0.92	0.39

*p < .05

who read the normal version of the passage or between the combined mean rank score of students who read the normal version of the passage compared to the combined mean rank score of students who read the disrupted version of the passage. The mean rank score of good readers who read the disrupted version of the passage was significantly different ($p < .05$) from the mean rank score of poor readers who read the disrupted version of the passage. This finding indicates that good readers talked about using context to understand and study the information in the disrupted text more often than poor readers.

Category Two. In Category Two, the mean rank score of good readers who read the disrupted version of the passage differed significantly ($p < .05$) from the mean rank score of poor readers who read that version of the passage, and the mean rank score of good readers who read the normal version of the passage also differed significantly ($p < .05$) from the mean rank score of poor readers who read the normal version of the passage. In both instances, the mean rank score of good readers was higher than the mean rank score of poor readers. This finding suggests that good readers in both text conditions talked about identifying the main topic of paragraphs more often than poor readers talked about using this strategy.

Category Three. In Category Three the only significant comparison indicated that the mean rank score of good readers who read the disrupted text did differ significantly ($p < .05$) from the

mean rank score of poor readers who read the disrupted text. Good readers in the disrupted text condition reported using strategies related to grouping the ideas in paragraphs more often than poor readers. This indicates that poor readers were unable to or did not think to use this strategy to help themselves study paragraphs that presented comprehension difficulties, whereas good readers frequently described using this type of strategy to help themselves overcome the disruptions in the text and to study and understand the information.

Category Four. In Category Four the only significant comparison indicated that the combined mean ranks of good and poor readers who read the normal version of the passage differed significantly ($p < .05$) from the combined mean ranks of good and poor readers who read the disrupted version of the passage. Thus, the statistical hypothesis for this comparison was rejected. Students who read the normal version of the text related the information in the passage to their prior knowledge and experience significantly more often than students who read the disrupted version of the passage. This result suggests that students who read the disrupted version of the passage may have been concentrating on making the information in the passage comprehensible and, therefore, were unable to attend to how the information related to their prior knowledge and experience.

Categories Five-Eleven. There were no significant differences among good and poor readers assigned to the normal or the disrupted text condition within any of the other categories identified, nor

were any significant differences obtained between the combined mean ranks of good and poor readers who read either the normal or the disrupted version of the passage in any of the other categories. Examination of the frequency data in Table 7, however, suggests that these results may be attributed to the small number of responses in each of the remaining categories.

Discussion. Based on these results, it was concluded that good and poor readers talked about using the same types of reading-study strategies, but good readers talked about using certain strategies more often than poor readers. These results are consistent with the findings reported by Olshavsky (1976-1977) in that good and poor readers did not differ in the type of strategies they said they used, but they did differ in the frequency with which they said they used some of the strategies identified.

In the present study, good readers in both the normal and the disrupted text conditions talked about using strategies assigned to Category Two more often than poor readers. Responses assigned to Category Two were statements students made about how they identified the important information in paragraphs by (1) looking for frequently repeated words, or (2) reading the first sentence and predicting the topic of the rest of the sentences. Good readers described using these types of strategies to help themselves understand and study more often than poor readers. This finding suggests that students classified as good readers are more aware of the strategies they use to identify and study important information in

written materials than poor readers.

Good readers who read the disrupted version of the passage also talked about using strategies assigned to Categories One and Two more often than poor readers who read the disrupted version of the passage. Responses assigned to Category One were statements students made about how they used contextual information to study and understand the passage, and responses assigned to Category Two were statements students made about grouping the ideas in paragraphs to study and understand the passage. Good readers who read the disrupted text talked about using context and about using grouping strategies more often than poor readers who read the disrupted text. These findings suggest that (1) good readers are more aware than poor readers of how context can be used to help themselves study and understand texts which present comprehension difficulties, and (2) they can group related ideas in paragraphs to help themselves study and understand difficult material.

The only category in which a significant difference was obtained between readers who read the normal and the disrupted version of the passage was in Category Four. Good and poor readers who read the normal version of the text talked about strategies included in Category Four more often than good and poor readers who read the disrupted version of the text. Responses assigned to Category Four were statements students made about using prior knowledge and experience as a strategy for studying and understanding information in the passage. This finding suggests that students who read the disrupted

version of the passage were more "text-bound" in the sense that they seemed to use strategies that would help them interrelate the ideas in paragraphs to make the paragraphs comprehensible. They tended not to employ strategies that involved using information that was not contained in the text. To borrow from Rumelhart's (in press) theory, students who read the disrupted version of the passage were relying on "bottom-up" strategies more than "top-down" strategies to help themselves study and understand information in the disrupted text condition. This interpretation is supported by the findings that good readers in the disrupted text condition also talked about using context and grouping strategies more than poor readers, and both of these strategies involved searching the text to find related information that could be used to make the disrupted passages meaningful. However, good and poor readers who read the normal version of the passage did not differ in the frequency with which they reported using these types of strategies.

RESEARCH QUESTION THREE

The third research question concerns differences in the amount of information recalled by students who frequently reported using reading-study strategies and students who infrequently reported using reading-study strategies. A recall test was used in the study for two reasons. The first reason for administering the recall test was to ensure that students who said they used strategies to study and understand the information in the passage actually understood and could remember the information. The second reason relates

to establishing that students' verbal reports were reliable in the sense that they could be used to discriminate between students who talked about using reading-study strategies frequently and students who talked about using reading-study strategies infrequently.

The research question was translated into the following statistical hypothesis:

Statistical Hypothesis 2. Students who frequently report using reading-study strategies will not differ in the amount of information they recall from students who infrequently report using reading-study strategies.

A median-split procedure was used to divide the students into two groups: (1) students above the median in number of strategies reported and (2) students below the median in number of strategies reported. The dependent measure in this analysis was the number of propositions each student recalled after reading. The propositions were derived from the passage using Kintsch's (1974) prose analysis system. A judge familiar with Kintsch's system was asked to score independently twelve of the students' recall protocols. Six of the protocols were randomly selected from the protocols of students who frequently said they used reading-study strategies, and six of the protocols were randomly selected from the protocols of students who infrequently said they used reading-study strategies. A .95 Pearson product-moment correlation coefficient was obtained between the researcher's and the judge's scoring of the protocols, indicating that the researcher had reliably scored the students' recall of information from the passage. The mean number of propositions recalled

by students in the two groups are shown in Table 9 as well as the results of the analysis of covariance of students' recall scores, adjusting for verbal fluency.

TABLE 9

ANALYSIS OF COVARIANCE OF STUDENTS' RECALL SCORES ADJUSTING FOR VERBAL FLUENCY TO COMPARE THE RECALL OF STUDENTS ABOVE AND BELOW THE MEDIAN IN NUMBER OF STRATEGIES REPORTED

Source	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>Significance</u>
Covariate	7470.43	1	7470.43	32.953	.000*
Between	1569.60	1	1569.60	6.924	.012*
Within	9294.75	41	226.70		
Total	18334.79	43	426.39		

Group	Students Above the Median	Students Below the Median
Mean	55.00	34.14
Standard Deviation	16.51	20.64

*p < .05

As shown in Table 9, the mean recall score of students classified as above the median in the number of strategies reported differed significantly from the mean recall score of students classified as below the median in the number of strategies reported. Thus, statistical hypothesis two was rejected. This finding indicates that students who said they used more strategies than other students in the interviews also recalled more information after reading and

studying the passage and that student verbal reports can be used to distinguish between groups of students on a recall test of comprehension.

RESEARCH QUESTION FOUR

The fourth research question concerned whether the frequency with which students said they used certain categories of reading-study behavior could be used to predict students' scores on a set of criterion-referenced tests of comprehension skill development. The reason this question was raised in the present study is that other researchers (Meichenbaum, et al., in press; Borkowski, in press) claim that self-report data like that obtained in the present study can be considered reliable and gains importance if it can be demonstrated that the data is related to and predictive of other measures of the cognitive domain investigated. That is, one way to establish that students' descriptions of the strategies they use to study and understand an expository text are useful sources of information is to show that the students' verbal reports are correlated with or predictive of some other measure of comprehension skill. Thus, research question four was formulated to determine whether students' descriptions of reading-study strategies could be used to predict their performance on the set of criterion-referenced tests.

The research question was translated into the following statistical hypothesis:

Statistical Hypothesis 3. The frequency with which students report using types of reading-study strategies when asked to read a normal and a disrupted text cannot be used to predict mastery or non-mastery of a set of criterion-referenced tests of comprehension skill development.

A discriminant analysis procedure was performed to test this hypothesis, and the SPSS discriminant analysis computer program (Nie, et al, 1975) was used to perform the analysis. Students' composite scores on the set of criterion-referenced tests of comprehension skill development served as the dependent variable. Students who achieved composite scores of 80 per cent correct on these tests were classified as Masters and students who achieved composite scores below 80 per cent correct were classified as Non-masters. Twenty-six students actually obtained scores that classified them as Masters, and eighteen students obtained scores that classified them as Non-masters.

The frequency scores of students who reported using strategies assigned to Categories One, Two, Three, and Four were the independent variables used in the discriminant analysis procedure. These scores were used to determine if the frequency with which students said they used strategies assigned to Categories One-Four could be used to predict students' classification as Masters or Non-masters of the set of criterion-referenced tests of comprehension skill development. Responses assigned to Categories One-Four were selected as independent variables for the discriminant analysis as these categories included responses made by at least 30 per cent of the students who participated in the study. This procedure was

followed to ensure that sufficient variation existed in the scores used as discriminating variables.

The mean scores in each category of students classified as Masters or Non-masters of the set of criterion-referenced tests are shown in Table 10.

TABLE 10
MEAN SCORES IN CATEGORIES ONE-FOUR OF MASTERS AND
NON-MASTERS OF THE CRITERION-REFERENCED TESTS

Group	<u>Categories of Reading-Study Strategies</u>			
	Category One	Category Two	Category Three	Category Four
Non-Masters	2.00	1.55	1.27	2.66
Masters	3.46	3.11	2.26	3.57

A basic assumption which must be met to perform a discriminant analysis test is that the covariance matrix for each of the groups on the discriminating variables should be equal to each other. Box's M test (Nie, et al, 1975) was computed to determine if this assumption was or was not violated in the present study. Results of the test indicated that the separate covariance matrices of the groups on the four discriminating variables were equal ($F = 1.8005$, $p > .05$). The pooled within-groups correlation matrix is presented in Table 11.

A Wilks' Lambda test was performed to determine whether students' scores on the independent variables could significantly

predict group membership. Results of this test are presented in Table 12. As shown, the results indicate that the frequency with which students said they used strategies in each of the four categories could significantly predict students' classification as Masters or Non-masters of the criterion-referenced tests of comprehension skill development.

TABLE 11
POOLED WITHIN GROUPS CORRELATION MATRIX

	Category One	Category Two	Category Three	Category Four
Category One	1.0000			
Category Two	.0870	1.0000		
Category Three	.0237	.3453	1.0000	
Category Four	.4653	.3495	.2273	1.0000

TABLE 12
RESULTS OF WILKS' LAMBDA TEST

<u>Wilks' Lambda</u>	<u>X²</u>	<u>df</u>	<u>Significance</u>
.7445	11.79	4	.0189*

*p < .05

A discriminant score for each student was computed by multiplying a student's scores on each of the discriminating variables by the coefficients listed in Table 13 and then adding the products to form a composite score. This composite score was used to classify students into groups of Masters and Non-masters. Discriminant function scores have a standard form in which the mean discriminant score for all the cases analyzed equals zero and the standard deviation of the scores is one. Mean scores for each group were also computed. The mean score of students classified as Masters was $-.47617$, and the mean score for students classified as Non-masters was $.68779$.

TABLE 13
CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS

Category One	$-.82099$	Category Three	$-.46690$
Category Two	$-.48183$	Category Four	$.40271$

In a discriminant analysis procedure, canonical coefficients serve to identify which variables contribute most to differentiation, or discrimination, of subjects into groups. Examination of the coefficients in Table 13 indicates that students who frequently said they used strategies assigned to Category Four, but infrequently said they used strategies assigned to Categories One-Three achieved higher scores on the discriminant function measures. That is, most of the students who talked about relating information in the text to prior

prior knowledge (Category Four) more often than they talked about using context (Category One) or identifying important ideas in the passage (Categories Two and Three) achieved discriminant scores that classified them as Non-masters, whereas most of the students who talked about using context (Category One) and strategies for identifying important information (Categories Two and Three) more often than they talked about relating the information in the text to prior knowledge (Category One) achieved discriminant scores that classified them as Masters.

Results of the classification procedure performed to determine the number of students who were correctly classified as Masters or Non-masters of the set of criterion-referenced tests are shown in Table 14. Examination of this table indicates that the frequency with which most students said they used strategies assigned to Categories One-Four could be used to predict mastery or non-mastery of the criterion-referenced tests. As shown in Table 14, approximately 80 per cent of the students were correctly classified as either Masters or Non-masters on the basis of the frequency with which they said they used strategies assigned to Categories One-Four.

Discussion

Results of the discriminant analysis procedure indicated that the frequency with which students said they used each of the strategies assigned to Categories One, Two, Three, and Four could be used to discriminate between students who were classified as Masters and students who were classified as Non-masters of a set of

criterion-referenced tests of comprehension skill development. Strategy responses assigned to Categories One-Three represented statements students made about using traditional types of comprehension skills such as using context clues and identifying important ideas in paragraphs. Strategy responses assigned to Category Four represented statements students made about relating information in the passage to prior knowledge and experience. Even though all of the students were not classified accurately as Masters or Non-masters, approximately 80 per cent of the students were classified accurately. This finding suggests that students' verbal reports, like those obtained in the present study, are predictive of or correlated with one conventional measure of comprehension skill development.

TABLE 14
RESULTS OF THE CLASSIFICATION PROCEDURE

Actual Group	n	<u>Predicted Group Membership</u>			
		<u>Non-Master</u>		<u>Master</u>	
		No.	%	No.	%
Non-Master	18	16	88.9	2	11.1
Master	26	7	26.9	19	73.1

Examination of the coefficients in Table 13 indicates that students who talked infrequently about using strategies assigned to Categories One-Three but frequently talked about using strategies assigned to Category Four achieved discriminant scores that were highly

correlated with the discriminant function score used in the classification analysis. This finding suggests that students who were classified as Non-masters said they used prior knowledge as a strategy for studying and understanding information in the text more than they said they used strategies for identifying important ideas or determining the meanings of words. The converse was observed with students classified as Masters. One possible interpretation of this finding is that students classified as Masters were aware of how various strategies similar to traditional types of comprehension skills could be used to study and understand an expository passage. Students classified as Non-masters, on the other hand, tended to rely on using prior knowledge as their primary strategy for studying and understanding the text.

POST HOC ANALYSES

Three post hoc analyses were performed to explore further the results obtained in the study related to Research Questions Two, Three, and Four. These analyses, the results, and the implications of the results are presented in this section.

Results of Post Hoc Analyses Related to Research Question Two

The researcher intended to use an analysis of covariance procedure to analyze students' strategy responses to control for possible differences among students in verbal fluency. Because the response data within each of the categories did not appear to be normally distributed, the researcher used the Kruskal-Wallis model of analysis of variance by ranks to analyze the response data and could not use a covariate within this model. However, an approximate procedure was employed to estimate the influence of verbal fluency on the frequency with which good and

poor readers reported using reading-study strategies.

Standard analysis of covariance tests were first performed to determine if good and poor readers in both the disrupted and the normal text condition differed in the frequency with which they reported using strategies when the effects of verbal fluency were controlled. These tests were computed only as a basis for comparing the effects of verbal fluency in standard covariance tests to the effects obtained when another approximate procedure was employed. Results of the analysis of covariance tests are shown in Tables 15.1-15.11, and these tables are located in Appendix H. Results of these tests indicated that when verbal fluency was controlled for, no differences were observed between the frequency with which good and poor readers said they used reading-study strategies in any of the categories except for Category Nine.

Kendall correlation coefficients (Marascuilo & McSweeney, 1977) were then computed to determine the degree of association between (1) reading ability status and strategy responses and (2) verbal fluency and strategy responses. The results of these analyses are presented in Tables 16 and 17. A Kendall Tau of .2837 was obtained between verbal fluency and reading ability status.

As shown in Table 16, there were statistically significant low to moderate correlations between reading ability status and student responses in five categories. Four of these correlations were obtained in the categories in which the researcher had found significant differences using the Kruskal-Wallis model. However, examination of Table 17 indicates that there were also statistically significant correlations between verbal fluency and strategy responses in these same categories.

TABLE 16

KENDALL CORRELATION COEFFICIENTS OF STRATEGY RESPONSES WITH READING
ABILITY STATUS BY CATEGORY

Category	τ T	Category	τ T
Category One	.3446*	Category Seven	.2683*
Category Two	.3865*	Category Eight	.1562
Category Three	.2915*	Category Nine	-.1840
Category Four	.3128*	Category Ten	-.1295
Category Five	.2068	Category Eleven	-.2217
Category Six	.2184		

* $p < .05$

TABLE 17

KENDALL CORRELATION COEFFICIENTS OF STRATEGY RESPONSES WITH VERBAL
FLUENCY BY CATEGORY

Category	τ T	Category	τ T
Category One	.2906*	Category Seven	.1550
Category Two	.2810*	Category Eight	.0260
Category Three	.3972*	Category Nine	.2147*
Category Four	.4564*	Category Ten	.1614
Category Five	.2225*	Category Eleven	-.2553*
Category Six	.0130		

* $p < .05$

To determine if the strength of the association between reading ability status and strategy responses would decrease when the relationship between verbal fluency and strategy responses was controlled for, a partial Tau procedure was employed. Results of these analyses are shown in Table 18.

TABLE 18
PARTIAL KENDALL CORRELATION COEFFICIENTS OF STRATEGY RESPONSES WITH
READING ABILITY STATUS CONTROLLING FOR VERBAL FLUENCY

Category	τ	Category	τ
Category One	.2858	Category Seven	.2368
Category Two	.3334	Category Eight	-.1706
Category Three	.2032	Category Nine	-.2615
Category Four	.2148	Category Ten	-.0884
Category Five	.1537	Category Eleven	.1660
Category Six	.2239		

Examination of the coefficients in Table 18 indicates that when the association between verbal fluency and response categories is partialled out, the association between reading ability and strategy response categories decreases in strength. This finding suggests that some of the differences observed between the frequency with which good and poor readers said they used particular categories of reading-study behavior could be due to differences in verbal fluency rather than due to differences in reading ability per se. That is, students who achieved high response scores may have achieved high scores simply

because they talked more than other students during the interviews and not necessarily because they used strategies more frequently. Unfortunately, the underlying distribution of the partial Kendall correlations is unknown, and these correlations could not be tested for statistical significance. They do suggest, however, that students may have differed in the number of strategies they said they used because of differences in verbal fluency.

Results of Post Hoc Analysis Related to Research Question Three

Results of the analysis of covariance test performed to answer research question three indicated that students who frequently said they used strategies recalled more information than students who infrequently said they used strategies. Even though the results of this analysis indicated that students' verbal reports about their reading-study behavior could be related to one type of comprehension test score data, an alternative explanation was possible. That is, students who reported using more strategies may have been students who were also classified as good readers. Results of previous research (Smiley, et al, 1977; Taylor, 1980) indicate that good readers typically recall more information than poor readers. Thus, the researcher performed a Chi square test of homogeneity of proportions to determine if students classified as above the median in number of strategies reported were also students classified as good readers. The number of students who were classified as good readers and above the median in strategies reported as well as the number of students who were classified as poor readers and below the median in number of

strategies reported are presented in Table 19.

TABLE 19
NUMBER OF STUDENTS CLASSIFIED AS GOOD AND POOR READERS AND
AS ABOVE OR BELOW THE MEDIAN IN STRATEGIES REPORTED

Strategy Group	n	Reading Ability Status			
		Good Reader		Poor Readers	
		No.	%	No.	%
Above Median	22	15	68.2	7	31.8
Below Median	22	7	31.8	15	68.2

Results of the Chi square test indicated that reading ability status was significantly associated with the number of strategies reported ($\chi^2 = 5.82, p < .02$). Students who were classified as good readers tended to be students who were also classified as above the median in strategies reported, and students classified as poor readers tended to be students who were also classified as below the median in number of strategies reported. Thus, the results of the original analysis of covariance test could be confounded with the reading ability status of the students.

Results of Post Hoc Analysis Related to Research Question Four

To answer Research Question Four, a discriminant analysis test was performed to determine if students' mastery or non-mastery of a set of criterion-referenced tests of comprehension skill development could be predicted from the number of times the students said they used strategies assigned to four different categories of reading-study

behavior. The dependent measure used in the discriminant analysis was a cut-off score. Students who achieved a composite score of 80 per cent correct on the tests were classified as Masters and students who achieved scores below 80 per cent correct were classified as Non-masters. A second analysis procedure was then performed to determine if students' total composite scores on the criterion-referenced tests could also be predicted from the frequency with which students said they used strategies assigned to the four categories used in the discriminant analysis test. In the second analysis, a multiple regression procedure was employed (Nie, et al, 1975) to determine if students' frequency scores within the four categories of reading-study behavior used as predictor variables were linearly related to their total composite scores on the criterion-referenced tests. Results of this analysis are presented in Table 20, and as indicated in this table, results of the analysis showed that students' composite scores on the criterion-referenced tests of comprehension could not be predicted from the frequency with which they said they used strategies in Categories One-Four. One reason this analysis may have been non-significant is because of the possible non-linearity of the distribution of the frequency response data within each of the predictor categories, and a second reason this analysis may have been non-significant is due to the fact that the composite total scores may have been uninterpretable. Criterion-referenced tests are constructed so that a cut-off score, such as that used in the discriminant analysis procedure, can be used to identify students who have and students who have not mastered comprehension skills. Thus, a total composite score on these tests

would not be as useful or as predictable as a cut-off score for discriminating between groups of students.

TABLE 20

REGRESSION ANALYSIS OF FREQUENCY SCORES ON THE TOTAL SCORES
ON THE CRITERION-REFERENCED TESTS

Source	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>R²</u>
Regression	969.66	4	242.41	2.165	.18175
Residual	4365.49	39	111.93		
Total	5335.15	43			

CHAPTER IV

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

The primary purpose of the study was to determine if students' insights about the strategies they used to understand and study an expository passage were similar to basic types of comprehension skills developed in many instructional programs used to teach reading in the elementary grades. Secondary purposes of the study involved (1) determining if good and poor readers differed in the types of strategies they described using to study and understand an expository passage, and (2) determining if students' verbal reports were related to a recall test of comprehension and to criterion-referenced tests of comprehension skill development. This chapter presents a summary of the study, the results, the conclusions that may be drawn from the results, the limitations of the results, and the implications of the results for researchers and practitioners.

SUMMARY OF THE LITERATURE REVIEWED AND RATIONALE

Most reading educators believe that students should be taught certain basic comprehension skills. Instruction in these skills supposedly provides students with skills that can be adapted into strategies for reading and learning from texts in all subject-matter areas. Even though most reading educators believe students develop comprehension ability through instruction, most of the skills common

to instructional materials used to teach reading in the elementary grades reflect the intuitions of reading educators more than the results of empirical research.

Much of the empirical support for teaching basic comprehension skills is derived from the results of product-oriented research in which investigators used the products of comprehension, in the form of test scores, to infer the skills or mental processes underlying comprehension performance. Other researchers, however, question the results of such studies because the "outcomes" of comprehension were used to infer the underlying, on-going processes of comprehension. These researchers argue for process-oriented studies, like the introspective-retrospective studies reported by some researchers, that focus on examining students' reading behavior as students actually perform reading tasks.

Introspective-Retrospective Research

Several investigators have used introspective-retrospective interview procedures to identify the cognitive processes underlying comprehension. Results of these studies are questionable because the relationship between a mental process and a subject's knowledge of that process is not known. However, some studies were reviewed in which researchers used introspective-retrospective interview procedures to determine the strategies students said they used to study and understand rather than using interview procedures to identify the covert mental processes underlying comprehension performance. Results of these studies suggest that good and poor readers reported

using similar types of reading-study strategies, but they differed in the frequency with which they reported using strategies or in their awareness of the strategies they used. In many of these studies, students were asked to describe the strategies they used to understand narrative materials, but results of one study reviewed indicated that students reported using different types of strategies depending on the nature of the material they were asked to read.

Although results of introspective-retrospective interview studies indicate that students can describe strategies they use to study and understand written materials, the investigators of these studies had no theoretical basis for accepting students' verbal reports as information relevant to reading performance. Only recently have researchers in experimental and educational psychology begun to accept students' self-reports or introspective responses as evidence related to cognitive performance. Much of the current interest in self-report information stems from notions related to the construct of metacognition.

Metacognition

The construct of metacognition concerns types of knowledge and insight people develop about their own problem-solving abilities and how people use such personal knowledge to help themselves solve problems. The construct was originated by Flavell to study how children learn to control their own memory behavior. Since then, other researchers have adopted the construct as a framework for studying how people use their prior knowledge and experience to solve

problems such as reading to be able to remember information from texts. A basic assumption shared by researchers interested in metacognitive development is that students develop insights and introspective knowledge about themselves, different tasks, and different strategies before they develop the ability to monitor and control their own problem-solving activities. Students are assumed to develop these forms of insight or self-knowledge through experiences like learning to read, to write, and to take tests. One researcher has specifically characterized metacognitive skills and knowledge related to reading performance as the same type of skills reading educators refer to as reading-study skills. From this characterization, it seems that students' descriptions of the strategies they use to understand and study printed materials should be related to traditional types of comprehension skills, like the skills common to instructional programs used to teach reading in the elementary grades.

Many researchers interested in studying metacognitive aspects of reading performance have focused on identifying the strategies older students use to monitor and control their own reading-study behaviors. Some studies were reviewed in which researchers interviewed young children and older students to identify types of insight students at different ages have about their own reading performance. But no studies were located in which researchers specifically tried to relate students' insights about their reading performance to types of skills commonly taught in elementary school reading programs.

Researchers do not believe that students' performance always

reflects metacognitive levels of awareness, but they do believe that students can become aware of the knowledge they have when they are actively involved in attempts to learn or solve problems. This suggests that students' ability to describe their reading-study behavior should become more conscious and deliberate when they are asked to read for study purposes or when they are working at overcoming comprehension difficulties. Results of some of the introspective-retrospective research lend support to this assumption in that researchers found that subjects were more aware of the strategies they used to read and study when they expected to take a recall test after reading than when they expected to take a recognition test after reading.

Results of introspective-retrospective studies also indicate that students who are younger than most sixth-graders are unable to describe the strategies they use to understand and study printed materials. These findings are consistent with much of the literature related to metacognitive development in that many researchers consider the verbal reports of students younger than middle-school-aged students unreliable. Thus, students selected to participate in an interview study for the purpose of describing the strategies they use to study and understand printed materials should be the age of most middle-school students or older.

Reliability of Verbal Reports

Until recently, many researchers in education and psychology considered the results of studies based on self-report data suspect.

Due to current notions related to metacognition, however, some researchers have begun to suggest ways to improve the accuracy of and reliability of subjects' verbal reports. For example, one way to establish that self-report information is reliable is to show that subjects' verbal reports can be used to discriminate among groups who differ in their problem-solving ability, and another way is to determine if subjects' verbal reports are correlated with or predictive of other measures of skill performance. Thus, literature was reviewed related to two types of comprehension measures, recall tests and criterion-referenced tests of comprehension skill development to identify measures which could be used to establish that students' verbal reports were reliable sources of information. Results of research related to Kintsch's (1974) prose representation system indicate that his system can be used as a technique for analyzing the meaning of texts and for scoring subjects' recall of information from texts. And literature related to criterion-referenced tests of comprehension indicate that the Wisconsin Tests of Reading Skill Development: Comprehension are one set of criterion-referenced tests that can be used to assess reliably students' attainment of comprehension skill objectives that are similar to the types of skills developed in widely used instructional reading materials.

Other suggestions for improving the accuracy of subjects' verbal reports include using tasks that are not well rehearsed and comparing subjects' responses against some predetermined check-list or classification system. Because reading is a well-rehearsed task for most

students, other researchers have used texts which were disrupted in some fashion to study subjects' comprehension monitoring strategies or to identify students' insights about the organizational features of prose materials.

Recent reviews of the skills common to reading methods texts and to widely-used instructional reading materials provide lists of skills that reading educators believe students should be taught; and these reviews provide a check-list of the types of skills one would expect students to talk about. The skills identified in these reviews represent the skills most frequently identified in instructional materials used to teach reading to elementary-school children, and they are the types of skills reading educators believe students adapt into strategies for reading and learning in all subject-matter areas.

The study reported here was an exploratory study designed to identify the strategies students said they used to study and understand an expository passage and to determine if students' insights about the strategies they used were related to traditional types of comprehension skills. Based on the preceding rationale, the following research questions were explored:

Given that the goal of reading is to recall information from an expository passage:

1. What types of strategies do good and poor readers report using when they are asked to describe how they read and studied a normal text or a disrupted text?
2. Do good and poor readers differ in the frequency with which they report using particular reading-study strategies when they are asked to read a normal or a disrupted text?

3. Do students who frequently report using reading-study strategies recall more information than students who report using reading-study strategies infrequently?
4. Can the types of reading-study strategies students report using when asked to read a normal and a disrupted text be used to predict mastery or non-mastery of a set of criterion-referenced tests of comprehension skill development?

METHOD

A stratified random sample of forty-four seventh-grade students was interviewed in the study. Twenty-two of the students were classified as good readers and twenty-two of the students were classified as poor readers based on their scores on the comprehension subtest of the Gates-McGinite Reading Test. The students were selected from a seventh-grade class of students attending a middle-school in south central Wisconsin.

Students participating in the study read an expository passage about a desert environment, and half of the students read a version of the passage which had been rewritten so that the paragraphs in the passage had been disrupted in certain ways. The students were randomly assigned to the normal or the disrupted text condition.

Students were interviewed individually and each interview was tape-recorded. The students were asked to read and study the passage silently, one paragraph at a time, for the purpose of remembering as much as possible after reading. Immediately after reading each paragraph students responded to a general open-ended question about the strategies they used to study and understand, followed by several probe questions which were designed to get students to clarify their responses

about the strategies they used to read the paragraph or to get further information from the students. After the students had worked through the entire passage in this manner, they were asked to respond to items in a questionnaire about strategies they may have used when they read the passage and about their perceptions of themselves as readers. A probed-recall test was then administered. The criterion-referenced tests of comprehension skill development were administered one week after all the interviews were completed.

DATA ANALYSIS AND RESULTS

The researcher transcribed the interview tapes and analyzed the student responses to identify the types of strategies students said they used to study and understand the passage. This analysis was performed to answer the first research question. The researcher did not impose categories on the student responses as she analyzed the protocols, but began to apply descriptive labels as similar types of responses occurred within the interview protocols. Based on this analysis, eleven categories of reading-study behavior were identified. Two independent judges were asked to score twenty of the interview protocols according to the classification system identified by the researcher. A Kendall correlation coefficient of .84 was obtained among the researchers and the two judges' scoring of the protocols, indicating the researcher had reliably classified the student responses into categories of reading-study behavior.

The categories of reading-study behavior identified in the study were then compared to lists of skills common to widely used instruc-

tional reading programs. Results of this comparison indicated that students talked about using five types of strategies that were similar to skills developed in many instructional reading programs, and they talked about using two strategies that were similar to traditional types of reading-study skills.

To answer the second research question, the categorized data were analyzed to determine if good and poor readers who read the normal or disrupted version of the text differed in the frequency with which they said they used strategies assigned to each category. Eleven sets of planned comparisons were computed using the Kruskal-Wallis model of analysis of variance by ranks. This test was employed because the distribution of the frequency scores within each category did not seem to be normally distributed. The tests were performed to determine if: (1) good and poor readers who read the disrupted version of the passage differed in the frequency with which they reported using a strategy; (2) good and poor readers who read the normal version of the passage differed in the frequency with which they reported using a strategy; and (3) students who read the disrupted version of the passage reported using a strategy more frequently than students who read the normal version of the passage.

Four significant differences were obtained among the eleven planned comparisons performed. In Category One, the mean rank score of good readers who read the disrupted version of the passage was significantly different ($p < .05$) from the mean rank score of poor readers who read the disrupted version of the passage. Good readers

said they used the types of strategies assigned to this category more often than poor readers. In Category Two, the mean rank of good readers in both text conditions differed significantly ($p < .05$) from the mean rank of poor readers. Again, good readers talked about using strategies assigned to Category Two more often than poor readers. The significant comparison obtained in Category Three indicated that the mean rank of good readers who read the disrupted version of the passage differed ($p < .05$) from the mean rank of poor readers who read the disrupted text. Good readers said they used strategies assigned to Category Three more frequently than poor readers. And, in Category Four, the only significant comparison indicated that the combined mean ranks of good and poor readers who read the normal version of the passage differed ($p < .05$) from the combined mean ranks of good and poor readers who read the disrupted version of the passage. Students who read the normal version of the passage said they used strategies assigned to this category more frequently than students who read the disrupted version of the passage.

To answer the third research question, an analysis of covariance test was performed to determine if students who frequently said they used reading-study strategies recalled more information than students who infrequently said they used reading-study strategies. The students' verbal fluency scores served as the covariate in this analysis. Results of the analysis of covariance test indicated that significant differences existed between the mean recall scores of students who said they used strategies frequently and students who said they used strategies

infrequently. Students who said they used strategies frequently recalled significantly ($p < .05$) more information than students who said they used strategies infrequently.

A discriminant analysis test was used to answer the fourth research question. The discriminant analysis was performed to determine if the frequency with which students said they used some of the strategies identified in the study could be used to predict mastery or non-mastery of a set of criterion-referenced tests of comprehension skill development. The independent variables in this analysis were students' frequency scores in four of the categories of reading-study behavior identified and the dependent variable in this analysis was students' scores on the criterion-referenced tests.

Results of the discriminant analysis test indicated that the independent variables selected to predict students' classification as masters or non-masters of the set of criterion-referenced tests could be used to create a discriminant score that significantly predicted ($p < .02$) students' Mastery or Non-mastery of the skills tested. Students who achieved high discriminant scores were classified as Non-masters and students who achieved low discriminant scores were classified as Masters. The discriminant score accurately predicted mastery or non-mastery of 80 per cent of the cases analyzed. Analysis of the standardized canonical discriminant function coefficients used to create the discriminant scores indicated that students who frequently said they used strategies assigned to Categories One-Three but infrequently used strategies assigned to Category Four were

classified as Masters, and students who infrequently said they used strategies assigned to Categories One-Three but frequently said they used strategies assigned to Category Four were classified as Non-masters.

Post-Hoc Analysis

Three types of post hoc analyses were performed. First a procedure that approximated analysis of covariance tests was used to determine if the observed differences between the frequency with which good and poor readers said they used strategies assigned to each category could have been due to differences in verbal fluency. Results indicated that in each of the categories identified, when the correlation between verbal fluency and strategy responses was partialled out, the correlation between reading ability and strategy responses decreased. This finding suggests that the significant differences obtained between the frequency with which students said they used strategies may have been due to differences in verbal fluency rather than to differences in reading ability status.

The second post hoc analysis was performed to determine if students classified as good readers were also students who were classified as above the median in the number of strategies they reported using. This analysis was performed to determine if the observed difference in the amount of information recalled by students classified as above or below the median in the number of strategies reported was confounded with reading ability. Results of a Chi square test of homogeneity of proportions indicated that good readers reported using

strategies significantly more often ($p < .05$) than poor readers; thus, the significant results of the analysis of covariance test employed could be confounded with the reading ability status of the students.

In the third post hoc procedure, a multiple regression analysis was performed to determine if students' composite total scores on the criterion-referenced tests could be predicted from the frequency with which students said they used certain strategies. The independent variables in this analysis were the same frequency scores used in the discriminant analysis test. Results indicated that students' composite scores on the criterion-referenced tests of comprehension could not be predicted from the frequency with which they said they used strategies in the categories used in this analysis.

CONCLUSIONS

Based on the results of the study, the following conclusions can be drawn:

1. When asked to read a normal or a disrupted version of an expository passage for the purpose of being able to remember, seventh-grade students talked about using strategies that were similar to five types of comprehension skills common to many instructional programs used to teach reading in the elementary grades. The strategies students described using are similar to the traditional skills of (a) understanding words in context, (b) recognizing main ideas, (c) locating details, (d) comparing and contrasting, and (e) recognizing cause-effect relationships. Students also described using strategies similar to traditional types of reading-study skills. The study

strategies students talked about using were imaging, self-questioning, skimming, and predicting test questions.

2. When asked to read a normal or a disrupted version of an expository passage, students did not talk about using strategies similar to the traditional comprehension skills of (a) predicting outcomes, (b) drawing conclusions, and (c) identifying a sequence of events.

3. When asked to read a normal or a disrupted version of an expository passage, good and poor readers did not differ in the types of strategies they said they used to study and understand.

4. Good and poor readers did differ in the frequency with which they said they used strategies assigned to three of the categories identified: (a) good readers who read the disrupted version of the passage talked about using context to study and understand more often than poor readers; (b) good readers who read the disrupted version of the passage talked about grouping ideas in paragraphs as a way of determining important ideas in the passage more often than poor readers who read the disrupted version of the passage; and (c) good readers in both text conditions talked about identifying the topic or most important ideas in paragraphs by finding words that were frequently repeated or by predicting the most important ideas from the first sentences in paragraphs.

5. Good and poor readers who read the normal version of the passage related the information in the text to their prior knowledge

and experience as a strategy for studying and understanding more often than students who read the disrupted version of the passage.

6. Students in both the normal and disrupted text conditions who described using strategies frequently recalled more information from the passage than students who described using strategies infrequently. This finding suggests that students' verbal reports about the strategies they use to study and understand can be used to discriminate among readers on one measure of comprehension.

7. Students' classification as Masters or Non-masters of a set of criterion-referenced tests of comprehension skill development could be predicted from the frequency with which they said they used strategies assigned to four categories of reading-study behavior. The strategies assigned to these four categories included (a) using context, (b) identifying the topic or predicting the topic of paragraphs, (c) grouping important ideas in paragraphs, and (d) relating the information in the text to prior knowledge and experience. Students classified as Masters said they used context, identified topics of paragraphs, and grouped important ideas in paragraphs to study and understand more frequently than they talked about relating the information in the text to their prior knowledge. Students classified as non-masters, however, talked about relating the information in the text to their prior knowledge and experience as a reading-study strategy more frequently than they talked about using the other three types of strategies. This finding suggests that students' descriptions of the strategies they used to study and understand can be used to predict

students' performance on tests of comprehension skill development.

LIMITATIONS

The conclusions derived from the results of this study are subject to the following limitations:

1. The findings of this study may be limited to the type of expository passage students were asked to read and study. The passage had an attributive organizational structure and the findings may not generalize to texts organized in conventional story structures or in other types of rhetorical patterns.
2. The results of the study may be generalized only to the population of students sampled. The students who participated in the study were selected from a population of seventh-grade students attending a suburban middle-school in south-central Wisconsin. Half of the students were classified as good readers and half of the students were classified as poor readers based on their scores on the comprehension subtest of the Gates-MacGinitie Reading Test.
3. The results of the study may only generalize to the particular interview procedure used in the study. An introspective interview technique was employed, and students were asked to describe the strategies they used to study and understand after reading entire paragraphs of the text.
4. The observed differences between the frequency with which students said they used strategies assigned to particular categories may have resulted from differences in verbal fluency among the students.

Students who frequently described using reading-study strategies may have done so simply because they talked more than other students.

5. The finding that students who frequently said they used reading-study strategies recalled more information than students who infrequently said they used strategies may be confounded with the reading ability status of the students. Most of the students classified as above the median in the number of strategies reported were students who were also classified as good readers.

IMPLICATIONS

The results of the present study have implications for teachers of reading as well as reading researchers. In this section, the implications of the results of the study for reading researchers will be presented and then the implications of the results for classroom teachers will be discussed.

Implications for Researchers

The results of the present study indicate that students' verbal reports about the strategies they use to study and understand written material can be useful sources of information to researchers. In this study, students' verbal descriptions of the strategies they used to study and understand an expository passage could be used to (1) discriminate among groups of students who differed in the amount of information they recalled after reading, and (2) predict students' classification as Masters or Non-masters of a set of criterion-referenced tests of comprehension skill development.

Results of the post hoc analyses performed in the study suggest that the observed differences between the frequency with which good and poor readers said they used strategies assigned to four of the categories identified might be confounded with how much students talked in the interviews, or their verbal fluency. This finding suggests that researchers who rely on interview data, like the data obtained in the present study, need to ensure that the differences obtained among subjects participating in interviews are not due to differences in verbal fluency. In the present study, a measure of verbal fluency was determined by dividing the number of words spoken by each student by the number of questions each student was asked, and this measure proved to be a significant covariate in the analysis of covariance performed on students' recall scores. Because the distribution of the frequency scores in each of the categories did not appear to be normally distributed, it was not possible to use an analysis of covariance test, adjusting for verbal fluency, to analyze students' strategy response data, thus alternative approximate procedures were employed. Results of these analyses indicated that if verbal fluency had been adjusted for, the observed significant differences between good and poor readers in some of the categories might not have been obtained. Thus, it is not clear in the present study whether some students were more verbally fluent in the interviews because they knew more about reading-study strategies or whether they reported using reading-study strategies frequently because they were more verbally fluent.

The questionnaire data obtained in the study was not interpretable. Some of the questions were global and less sophisticated than the students' actual descriptions of the strategies they used to study and understand. This suggests that items about students' reading-study behavior included in questionnaires should be piloted to ensure that the questions will discriminate among various groups of readers.

Implications for Classroom Teachers

The results of the present study indicate that seventh-grade students not only know about but say they used reading-study strategies that are similar to types of comprehension skills commonly taught in elementary school reading programs. Thus, the results of the study provide support for the widely-held belief among reading educators that students should be taught basic types of reading comprehension skills.

Although good and poor readers did not differ in the kinds of strategies they said they used to study and understand the passage, good readers who read the disrupted version of the passage reported using strategies to identify the meanings of words and to identify important ideas more frequently than poor readers. When confronted with paragraphs that were difficult to understand, good readers described using reading-study strategies that helped them interrelate and understand the ideas in the paragraphs more often than poor readers. This suggests that good readers are more aware than poor readers of how certain types of comprehension skills can be used to understand

difficult texts. That is, when given texts that present comprehension difficulties, good readers were more aware than poor readers of comprehension skills that could be used as "debugging" (Brown, in press) strategies to help themselves study and understand.

From the results of Durkin's (1979) research, it appears that many classroom teachers are providing students with practice in using basic comprehension skills, but that teachers may not be teaching students how to use the skills they are asked to practice. If this is the case, good readers may spontaneously develop awareness of how skills can be used to understand various types of texts and why the skills are useful. Without explicit instruction, poor readers may not develop these insights. As noted by Norman (1976), practice alone may not lead to improved learning. Acquiring new knowledge as well as strategies for debugging one's knowledge are cognitive tasks that require study, thought, or instruction and guidance. Therefore, teachers need to be sure that all students are (1) made consciously aware of skills they can use to study and understand printed materials and (2) shown why skills are useful as well as when, where, and how skills can be applied when reading various types of texts.

Another important finding in the present study is that students who frequently said they used context as a strategy to determine the meanings of words and used various types of strategies for identifying important information in the passage more often than they talked about relating the ideas in the passage to prior knowledge were students who achieved mastery scores on a set of criterion-referenced tests of

comprehension skill development. The converse was true of students who did not achieve mastery scores. Thus, students who were classified as Masters of a set of criterion-referenced tests were students who talked about using various types of reading-study strategies, whereas students who were classified as Non-masters of the tests primarily talked about using prior knowledge as a reading-study strategy. One possible interpretation of this finding is that students' classified as Non-masters were not aware of how various types of comprehension skills could be used to study and understand an expository passage. Instead, these students appeared to rely on one strategy, relating the information in the text to personal knowledge and experience, as the primary means of studying and understanding the passage. This suggests that an over-reliance on teaching strategies that emphasize relating information in printed materials to prior knowledge at the expense of instruction in other types of comprehension skills may be counterproductive for some students.

REFERENCE NOTES

1. Flavell, J., Speer, J., Green, F. and August, D. The development of comprehension monitoring and knowledge about communication. Unpublished manuscript, Stanford University, 1980.
2. Meyer, B. J. F. and Freedle, R. O. Effects of discourse type on recall. Manuscript submitted for publication, 1979.
3. Camperell, K. and White, S. Analyzing self-report data. Manuscript in progress, 1980.

REFERENCES

- Ames, W. S. The development of a classification scheme of contextual aids. Reading research quarterly, 1966, 2, 57-82.
- Anderson, T. Study skills and learning strategies. In H. O'Neil (Ed.) Learning strategies. New York: Academic Press, 1979.
- Artley, S. Trends and practices in secondary school reading. Newark, Delaware: International Reading Association, 1968.
- Athey, I. Comments on design for developing comprehension skills. In J. T. Guthrie (Ed.) Cognition, curriculum and comprehension. Newark, Delaware: International Reading Association, 1977.
- Bagford, J. Management systems and comprehension: Do not mix! Language arts, 1977, 54.
- Baker, L. Comprehension monitoring: Identifying and coping with text confusions. (Tech. Report No. 145). Urbana, Illinois: Center for the Study of Reading, University of Illinois, September, 1979.
- Baker, L. and Brown, A. Metacognitive skills of reading. In P. D. Pearson (Ed.), Handbook of reading research, in press.
- Borkowski, J. G. Signs of intelligence: Strategy generalization and metacognition. In S. Yussen (Ed.), The growth of insight in children. New York: Academic Press, in press.
- Bormuth, J. R. An operational definition of comprehension instruction. In K. S. Goodman and J. T. Fleming (Eds.), Psycholinguistics and the teaching of reading. Newark, Delaware: International Reading Association, 1969.
- Brown, A. L. Knowing when, where, and how to remember: A problem of metacognition. (Tech. Report No. 47). Urbana, Illinois: Center for the Study of Reading, University of Illinois, June, 1977 (a).
- Brown, A. L. Development, schooling, and the acquisition of knowledge about knowledge. In R. C. Anderson, R. J. Spiro, and W. E. Montague (Eds.), Schooling and the acquisition of knowledge. Hillsdale, New Jersey: Lawrence Erlbaum Associates, 1977 (b).

- Brown, A. L. Metacognitive development and reading. In R. J. Spiro, B. Bruce, and W. F. Brewer (Eds.) Theoretical issues in reading comprehension. Hillsdale, N.J.: Lawrence Erlbaum Associates, in press.
- Brown, A. L. and DeLoache, J. S. Skills, plans, and self-regulation. In R. Siegler (Ed.), Children's thinking: What develops? Hillsdale, N.J.: Lawrence Erlbaum Associates, 1978.
- Brown, A. L. and Smiley, S. S. Rating the importance of structural units of prose passages: A problem of metacognitive development. Child development, 1977, 48, 1-8 (a).
- Brown, A. L. and Smiley, S. S. The development of strategies for studying prose passages. (Tech. Report No. 66). Urbana, Illinois: Center for the Study of Reading, University of Illinois, July, 1977 (b).
- Brown, A. L., Smiley, S. S., and Lawton, S. The effects of experience on the selection of suitable retrieval cues for studying from prose passages. (Tech. Report No. 53). Urbana, Illinois: Center for the Study of Reading, University of Illinois, July, 1977.
- Campione, J. C. and Brown, H. L. Memory and metamemory development in educable retarded children. In R. V. Kail and J. W. Hagen (Eds.) Perspectives on the development of memory and cognition. Hillsdale, N.J.: Lawrence Erlbaum Associates, 1977.
- Campione, J. C. and Brown, A. L. Toward a theory of intelligence: Contributions from research with retarded children. Intelligence, 1979, 2, 279-304.
- Canney, G. and Winograd, P. Schemata for reading and reading comprehension performance. (Tech. Report No. 120). Urbana, Illinois: Center for the Study of Reading, University of Illinois, April, 1979.
- Carroll, J. B. Learning from verbal discourse in educational media: A review of the literature. (Final Report Project 7-1069). Princeton, N.J.: Educational Testing Service, 1972.
- Carroll, J. B. Defining language comprehension: Some speculations. In R. O. Freedle and J. B. Carroll (Eds.), Language comprehension and the acquisition of knowledge. New York: John Wiley and Sons, 1972.

- Chester, R. D. The Wisconsin design for reading skill development: The comprehension component. In F. P. Greene (Ed.), Investigations relating to mature reading. 21st Yearbook of the National Reading Conference. Clemson, S.C.: The National Reading Conference, 1972.
- Danner, F. W. Children's understanding of inter-sentence organization in the recall of short descriptive passages. Journal of educational psychology, 1976, 68, 174-183.
- Davis, F.B. Psychometric research on comprehension in reading. Reading research quarterly, 1972, 7, 628-678.
- Dewey, J. C. A case study of reading comprehension difficulties in American history. Doctoral thesis in education III. (University of Iowa Studies in Education, 10). Iowa City, Iowa: University of Iowa, 1935, 26-54.
- Dollerup, C. On reading short stories. Journal of reading, 1971, 14, 445-454.
- Durkin, D. What classroom observations reveal about comprehension instruction. (Tech. Report No. 106). Urbana, Illinois: Center for the Study of Reading, University of Illinois, 1979.
- Ebel, R. L. The case for norm-referenced measurements. Educational researcher, 1978, 7, 3-5.
- Fareed, A. A. Interpretive responses in reading history and biology: An exploratory study. Reading research quarterly, 1971, 6, 493-532.
- Farr, R. and Weintraub, S. Editorial: Methodological incarceration. Reading research quarterly, 1974-75, 10, 4.
- Fay, L. C. The relationship between specific reading skills and selected areas of sixth-grade achievement. Journal of educational research, 1950, 43, 541-547.
- Fillmore, C. The case for case. In E. Bach and K. Harms (Eds.), Universals in linguistic theory. New York: Holt, Rinehart & Winston, 1968.
- Flavell, J. H. First discussant's comments: What is memory development the development of? Human development, 1971, 14, 272-278.

- Flavell, J. H. Metacognitive aspects of problem-solving. In L. B. Resnick (Ed.), The nature of intelligence. Hillsdale, N.J.: Lawrence Erlbaum Associates, 1976.
- Flavell, J. H. Cognitive development. Englewood Cliffs, N.J.: Prentice Hall Inc., 1977.
- Flavell, J. H. Cognitive monitoring. Paper presented at the Conference on Children's Oral Communication Skill, University of Wisconsin, October, 1978 (a).
- Flavell, J. H. Metacognition. Paper presented in E. Langer (Chair), Current perspectives on awareness and cognitive processes. Symposium presented at the meeting of the American Psychological Association, Toronto, 1978 (b).
- Flavell, J. H. Metacognitive and cognitive monitoring. American psychologist, 1979, 34, 906-911.
- Frederiksen, C. H. Acquisition of semantic information from discourse: Effects of repeated exposures. Journal of verbal learning and verbal behavior, 1975, 14, 158-169.
- Frederiksen, C. H. Discourse comprehension and early reading. In L. B. Resnick and P. A. Beck (Eds.) Theory and practice of early reading, Vol. 1. Hillsdale, N.J.: Lawrence Erlbaum Associates, 1979.
- Gates-MacGinitie Reading Tests: Survey E. New York: Teachers College Press, 1965.
- Glaser, A. R. Instructional technology and the measurement of learning outcomes. American psychologist, 1963, 18, 519-521.
- Golinkoff, R. M. A comparison of reading comprehension processes in good and poor comprehenders. Reading research quarterly, 1975-76, 11, 623-659.
- Gray, W. S. New approaches of educational research. Journal of educational research, 1958, 52, 65-67.
- Green, D. R. Item characteristics and criteria. In R. M. Bossone and L. Q. Troyka (Eds), Proceedings of the National Conference on Minimal Competencies: Trends and issues. New York: Center for Advanced Study in Education, 1977.

Grimes, J. The thread of discourse. The Hague: Mouton, 1975.

Hambelton, R., Swaminathan, H., Algina, J. and Coulson, D. Criterion-referenced testing and measurement: A review of technical issues and developments. Review of educational research, 1978, 48, 1-47.

Harker, W. J. Introspective-retrospective case studies in retrospect: Implications for modeling the reading process. In P. Naegele (Ed.), Interaction: Research and practice in college and adult reading. 23rd Yearbook of the National Reading Conference. Clemson, S.C.: The National Reading Conference, 1974.

Huey, E. G. On the psychology and physiology of reading, II. American journal of psychology, 1901, 12, 292-313.

Jacobson, M. V. A linguistic feature analysis of verbal protocols associated with pupil responses to standardized measures of reading comprehension. Unpublished doctoral dissertation, University of Minnesota, 1973.

Jenkinson, M. D. Cognitive processes in reading: Implications for further research and classroom practice. In J. A. Figurel (Ed.), Reading and realism. Proceedings of the Thirteenth Annual International Reading Association Convention. Newark, Delaware: The International Reading Association, 1969.

Johnson, D. Skills management systems: Some issues. Language arts, 1977, 54, 511-516.

Johnson, R. E. Recall of prose as a function of the structural importance of the linguistic units. Journal of verbal learning and verbal behavior, 1970, 9, 12-20.

Johnson, D. and Barrett, T. Prose comprehension: A descriptive analysis of instructional practices suggested in a selected sample of current instructional and professional sources. In C. Santa and B. Hayes (Eds.), Children's prose comprehension: Research and practice. Newark, Delaware: The International Reading Association, in press.

Johnson, D. D. and Pearson, P. D. Skills management systems: A critique. The reading teacher, 1975, 28, 757-764.

Kintsch, W. The representation of meaning in memory. New York: John Wiley and Sons, 1974.

- Kintsch, W. Comprehension and memory of text. In W. K. Estes (Ed.), Handbook of learning and cognitive processes. Hillsdale, N.J.: Lawrence Erlbaum Associates, 1978.
- Kintsch, W. On modeling comprehension. Educational psychologist, 1971, 14, 3-14.
- Kintsch, W., Kozminsky, E., Streby, W., McKoon, G. and Keenan, J.M. Comprehension and recall of text as a function of content variables. Journal of verbal learning and verbal behavior, 1975, 14, 196-214.
- Kintsch, W. and Van Dijk, T. Toward a model of text comprehension. Psychological review, 1978, 85, 363-393.
- Klopp, P. M., Hogum, C. L., Steward, D. M. and Kamm, K. Technical manual for forms P and Q of the Wisconsin Test of Reading Skill Development: Comprehension. (Tech. Report No. 465). Madison, Wisconsin: Wisconsin Research and Development Center for Individualized Schooling, September, 1978.
- Lieberman, D. A. Behaviorism and the mind: A (limited) call for a return to introspection. American psychologist, 1979, 34, 319-333.
- Maccoby, E. and Maccoby, N. The interview: A tool of social science. Handbook of social psychology. Reading, Mass: Addison-Wesley, Inc., 1954, Vol. 1.
- Mandler, J. M. and Johnson, N.S. Remembrance of things parsed: Story structure and recall. Cognitive psychology, 1977, 9, 111-151.
- Maney, E. S. Literal and critical reading in science. Journal of experimental education, 1958, 27, 57-64.
- Marascuilo, L. H. and McSweeney, M. Nonparametric and distribution-free methods for the social sciences. Monterey, CA.: Brooks/Cole Publishing Co., 1977.
- Markman, E. M. Comprehension monitoring. Paper presented at the Conference on Children's Oral Communication Skill, University of Wisconsin, October, 1978.
- Mason J., Osborn, J. and Rosenshine, B. A consideration of skill hierarchy approaches to the teaching of reading. (Tech. Report No. 42). Urbana, Illinois: Center for the Study of Reading, University of Illinois, December, 1977.
- McCallister, J. Reading difficulties in studying content subjects. Elementary school journal, 1930, 31, 191-201.

- Meichenbaum, D., Burlandt, S. and Gruson, L. Metacognitive Assessment. In S. Yussen, (Ed.) The growth of insight in children. New York: Academic Press, in press.
- Meskauskas, J. H. Evaluation modes for criterion-referenced testing: Views regarding mastery and standard setting. Review of educational research, 1976, 46, 133-158.
- Meyer, B. J. F. The organization of prose and its effects on memory. unpublished doctoral dissertation. Cornell University, 1974.
- Meyer, B. J. F. Identification of the structure of prose and its implicators for the study of reading and memory. Journal of reading behavior, 1975, 1, 7-47.
- Meyer, B. J. F. What is remembered from prose: A function of passage structure. In R. O. Freedle (Ed.), Discourse processes: Advances in research and theory. Hillsdale, N.J.: Ablex Publishing Company, 1977.
- Meyer, B. J. F. In selected review and discussion of basic research on prose comprehension. In Fisher and C. Peters, Newark, Delaware: International Reading Association, in press.
- Mischel, W. On the interface of cognition and personality: Beyond the person. Situation debate. American psychologist, 1979, 9, 740-754.
- Myers, M. and Paris, S. Children's metacognitive knowledge about reading. Journal of Educational Psychology, 1978, 70, 680-690.
- Nisbett, R. E. and Wilson, T. D. Telling more than we can know: verbal reports on mental processes. Psychological review, 1977, 84, 231-259.
- Newell, A. and Simon, H. A. Human problem solving. Englewood Cliffs, N.J.: Prentice-Hall, 1972.
- Nie, N. H., Hull, C. H., Jenkins, J. G., Steinbrenner, K., and Brent, D. Statistical package for the social sciences. New York: McGraw-Hill, 1975.
- Norman, D. A. Memory and attention: An introduction to human information processing. New York: John Wiley & Sons, 1976.
- Olshavsky, J. D. An exploratory analysis of the reading process. Unpublished doctoral dissertation, Indiana University, 1975.

- Olshavsky, J. D. Comprehension profiles of good and poor readers across materials of increasing difficulty. In P. D. Pearson and J. Hansen (Eds.), Reading: Disciplined inquiry in process and practices. 27th Yearbook of the National Reading Conference. Clemson, S.C.: The National Reading Conference, 1978.
- Olshavsky, J. D. Reading as problem-solving: An investigation of strategies. Reading research quarterly, 1976-1977, 12, 654-674.
- Otto, W. Design for developing comprehension skills. In J.T. Guthrie (Ed.), Cognition, curriculum, and comprehension. Newark, Delaware: International Reading Association, 1977.
- Otto, W., Chester, D., McNeil, J. and Meyer, S. Focused reading instruction. Reading, Mass.: Addison-Wesley, 1974.
- Otto, W. and Kamm, K. Teacher's planning guide. Minneapolis, Minn.: National Computer Systems, 1977.
- Palmer, W. S. Reading a thought and language process. The high school journal, 1975, 59, 59-59.
- Pearson, P. D. and Johnson, D. Teaching reading comprehension. New York: Holt, Rinehart and Winston, 1978.
- Pierkarz, J. A. Getting meaning from reading. Elementary school journal, 1956, 56, 303-309.
- Pines, A.L., Novak, J. D., Posner, G. J., and VanKirk, J. The clinical interview: A method for evaluating cognitive structure. (Research Report No. 6). Ithaca, New York: Department of Education, Cornell University, September, 1978.
- Pipho, C. An overview regarding minimal competencies. In R. M. Bossone and L. Q. Troyka (Eds.), Proceedings of the National Conference on Minimal Competencies: Trends and issues. New York: Center for Advanced Study in Education, 1977.
- Popham, W. J. The case for criterion-referenced measurements. Educational researcher, 1978, 7, 8-10.
- Quealy, F. J. Senior high school students' use of contextual aids in reading. Reading research quarterly, 1969, 4, 512-533.
- Resnick, L. and Beck, J. Designing instruction in reading: Interaction of theory and practice. In J. Guthrie (Ed.), Aspects of reading acquisition. Baltimore, Md: Johns Hopkins University Press, 1976.

- Ring, J. W. A study of the interpretive processes employed by selected adolescent readers of three short stories. Unpublished doctoral idssertation, Ohio State University, 1968.
- Robinson, H. A. Reading skills employed in solving social studies problems. The reading teacher, 1965, 18, 263-269.
- Rumelhart, D. E. Notes on a schema for stories. In D. G. Bobrow and A. M. Collins (Eds.), Representation and understanding. New York: Academic Press, 1975.
- Schank, R. C. and Abelson, R. Scripts, plans, goals, and understanding. Hillsdale: Lawrence Erlbaum Associates, 1977.
- Shores, J. H. Skills related to the ability to read history and science. Journal of educational research, 1943, 36, 584-593.
- Simon, H. Reading comprehension: The need for a new perspective. Reading research quarterly, 1971, 6, 338-363.
- Smiley, S., Oakley, D., Worth, D., Campione, J. and Brown, A. Recall of thematically relevant material by adolescent good and poor readers as a function of written versus oral presentation. Journal of educational psychology, 1977, 69, 381-387.
- Smirnov, A. A. Problems of the psychology of memory. New York: Plenum Press, 1973.
- Smith, H. K. The responses of good and poor readers when asked to read for different purposes. Reading research quarterly, 1967. 3, 53-83.
- Sochor, E. E. Literal and critical reading in social studies. Journal of experimental education, 1958, 27, 49-55.
- Spache, G. D. and Spache, E. B. Reading in the elementary school. Boston, Mass.: Allyn and Bacon, Inc., 1977.
- Squire, J. R. The responses of adolescents while reading four short stories. National Council of Teachers of English Research Report, 1964,
- Stallard, C. Managing reading instruction: Comparative analyses of objective-based reading programs. Educational technology, 1977, 17, 21-26.

- Stein, N. L. and Glenn, C. G. An analysis of story comprehension in elementary school children. In R. O. Freedle (Ed.), Discourse processing: Multi-disciplinary perspectives. Hillsdale, N.J. : Ablex Publishing Co., 1979.
- Sternberg, R. J. The nature of mental abilities. American psychologist, 1979, 34, 214-230.
- Strang, R. Reactions to research in reading. The education forum, 1962, 26, 187-192.
- Strang, R. and Rogers, C. How do students read a short story? English journal, 1965, 54, 819-823, 829.
- Swain, E. Conscious thought processes used in the interpretation of reading materials. Unpublished doctoral dissertation, University of Chicago, 1953.
- Taylor, B. Children's memory for expository text after reading. Reading research quarterly, 1980, 15, 399-411.
- Thorndyke, P. W. Cognitive structures in comprehension and memory of narrative discourse. Cognitive psychology, 1977, 9, 77-110.
- Thompson, R. H. and Dziuban, C. D. Criterion-referenced tests in perspective. The reading teacher, 1973, 27, 292-294.
- Thorndike, E. L. Reading as reasoning: A study of mistakes in paragraph reading. Journal of educational psychology, 1917, 8, 323-332.
- Turner, A. and Greene, E. The construction of a propositional textbase. JSAS catalog of selected documents in psychology, 1978.
- Wisconsin Tests of Reading Skill Development: Comprehension, Level F. Minneapolis, Minn: National Computer Systems, 1977.
- Wolf, R. L. and Tymitz, B. L. Guest editorial: Ethnography and reading: Matching inquiry mode to process. Reading research quarterly, 1976-1977, 12, 1.

APPENDIX A

NORMAL AND DISRUPTED VERSIONS OF THE PASSAGE

NORMAL TEXT - THE KALAHARI DESERT

In southwestern Africa there is a great stretch of dry land. The land is flat with no lakes or rivers. Vegetation is scarce. The plants and animals that live here have adapted to an environment with little water and high temperatures. This land is the Kalahari Desert. The Kalahari Desert covers part of three nations of southern Africa.

The plants of the Kalahari have adapted to the desert environment. Most of these plants are grasses and bushes. However, every now and then across the barren desert a huge, 200-foot baobab tree is seen. Its great, thick branches reach like stretching arms into the sky. The bark is thick and smooth, and sags in folds toward the bottom of the tree. The tree is adapted to the hot, dry climate because it is able to store water in the spongy wood of its huge trunk. Some of the other desert plants store water in large underground roots. Many rest as seeds until the rainy season. The seeds cannot germinate without water, but when the rain falls, the seeds can finally sprout.

The desert is without rain for almost 10 months of the year. Rains come to the Kalahari in December, January, and February. At this time, holes in the ground fill with water, and small ponds form. All of the desert life becomes active with the coming of the rains. The grass turns green, and new leaves and blossoms appear on the

bushes. Flowering plants add bright colors to the desert scene. Much of the plant life sprouts from seeds that have rested while waiting for moisture. These plants bud, blossom, and bear their seeds quickly, for the season is short. The animals of the Kalahari graze on the new, tender plants brought to life by the long-awaited rains.

In March the drought, or dry time, returns. When the rains stop, the water holes start to dry up. They become slippery mud and then caked white earth. By June only little water holes which are deep in the ground and covered with long grass are left. These water holes are miles apart, and travel in the desert is nearly impossible when the water holes completely dry up in August.

The Kalahari Desert is the home of people called Bushmen. The Bushmen are rather small people. As adults, they are four and one-half to just over five feet tall. These people once lived on rich grasslands south of the Kalahari. In a war with cattle-raising peoples for the grasslands, the Bushmen were driven north. Fleeing for safety, they settled on the Kalahari Desert, and as a hunting and gathering people still live as the earliest people on earth once did.

Because of the harsh desert conditions, the Bushmen do not plant crops or herd animals. Instead, they gather roots, berries, and nuts, and hunt animals. When the water holes in one place are dry and little food remains, the Bushmen must move to a new place. In their search for food and water, these people must move a great deal. They do not stay in one spot, but migrate from place to place. Such people are called nomads.

Where food and water can be found, a band of about 20 Bushmen set up a werf, which is their word for camp. A visitor could probably walk through the werf without knowing it because the small, cone-shaped houses made of sticks and grass look much like bushes. The Bushmen live in their skerms which give them shade during the day and shelter from the cool winds at night. Near the houses is a carefully placed row of ostrich eggshells, often decorated with carved designs of zigzags and diamonds, or animal pictures. The eggshells are important because they hold water. Each one is filled through a hole cut in the shell. The hole is then stopped up with grass.

The main task of desert survival is finding food and water. The Bushmen know the land well. When the water holes dry up, the Bushmen must search for new sources of water. A Bushman can find water where no one else would think to look. He might walk a few feet to a little bush and pull out a tsama melon. He would make a hole in the top, mash the insides with a stick, and then drink the good juice. Other plants such as the bi and ga roots and the wild cucumber may be eaten for their juice. Another way a Bushman can get water is from sip wells. In some places, rain water is held in the moist sand. The water is three to four feet from the surface. At such places the Bushman digs into the sand with a reed, which is a kind of grass with a hollow stem like a drinking straw. He sucks water through the reed and then stores the water in an ostrich eggshell. The Bushman works hard to get this necessity for survival.

The Bushmen do not wander across the whole desert alone. To survive, they live together in small bands. Each band has its own territory, which includes a water hole and a vast stretch of land around it. People who are not part of the band must ask permission to enter another band's territory. When a band moves, it goes to another place in its own territory and sets up a new werf.

DISRUPTED TEXT - THE KALAHARI DESERT

Some desert animals seek a drink or store water in surprising places. In southwestern Africa there is a great stretch of dry land. The land is flat with no lakes or rivers. Vegetation is scarce. The plants and animals that live here have adapted to an environment with little water and high temperatures. This land is the Kalahari Desert. The Kalahari Desert covers part of three nations of southern Africa. Desert tortoises carry extra body water around with them in two sacs under their upper shell.

The plants of the Kalahari have adapted to the desert environment. Most of these plants are grasses and bushes. However, every now and then across the barren desert a huge, 300 foot baobab tree is seen. Many rest as seeds until the rainy season. Its great, thick branches reach like stretching arms into the sky. Some of the other desert plants store water in large underground roots. The bark is thick and smooth, and sags in folds toward the bottom of the tree.

The seeds cannot germinate without water, but when the rain falls, the seeds can finally sprout. The tree is adapted to the hot, dry climate because it is able to store water in the spongy wood of its huge trunk.

A number of animals such as lions live in the Kalahari Desert. The desert is without rain for almost 10 months of the year. Rains come to the Kalahari in December, January, and February. At this time, holes in the ground fill with water, and small ponds form. All of the desert life becomes active with the coming of the rains. The grass turns green, and new leaves and blossoms appear on the bushes. Flowering plants add bright colors to the desert scene. Much of the plant life sprouts from seeds that have rested while waiting for moisture. These plants bud, blossom, and bear their seeds quickly, for the season is short. The animals of the Kalahari graze on the new, tender plants brought to life by the long awaited rains. Some of the animals of the Kalahari eat other animals.

In March the drought, or dry time, returns. When the rains stop, the water holes start to dry up. They become slippery mud and then caked white earth. Very large birds called vultures eat animals that are already dead. By June only little water holes which are deep in the ground and covered with long grass are left. These water holes are miles apart, and travel in the desert is nearly impossible when the water holes completely dry up in August.

The Kalahari Desert is the home of people called Bushmen. The Bushmen are rather small people. As adults, they are four and one-half

to just over five feet tall. These people once lived on rich grasslands south of the Kalahari. In a war with cattle-raising peoples for the grasslands, the Bushmen were forced to move north. The Bushmen won the battle. Fleeing for safety, they settled on the Kalahari Desert, and as a hunting and gathering people still live as the earliest people on earth once did.

Because of the harsh desert conditions, the Bushmen do not plant crops or herd animals. They do not stay in one spot, but migrate from place to place. Instead, they gather roots, berries, and nuts, and hunt animals. Such people are called nomads. In their search for food and water, these people must move a great deal. When the water holes in one place are dry and little food remains, the Bushmen must move to a new place.

Where food and water can be found, a band of about 20 Bushmen set up a werf, which is their word for summer. A visitor could probably walk through the werf without knowing it because the small, cone-shaped houses made of sticks and grass look much like bushes. The Bushmen live in these skerms which give them shade during the day and shelter from the cool winds at night. Near the houses is a carefully placed row of ostrich eggshells, often decorated with carved designs of zigzags and diamonds, or animal pictures. The eggshells are important because they hold water. Each one is filled through a hole cut in the shell. The hole is then stopped up with grass.

The main task of desert survival is finding food and water. The water is three to four feet from the surface. He might walk a few feet to a little bush and pull out a tsama melon. In some places, the rain water is held in the moist sand. Other plants such as the bi and ga roots and the wild cucumber may be eaten for their juice. The Bushmen know the land well. He sucks water through the reed and then stores the water in an ostrich eggshell. A Bushman can find water where no one else would think to look. Another way a Bushman can get water is from sip wells. When the water holes dry up, the Bushmen must search for new sources of water. The Bushman works hard to get this necessity for survival. He would make a hole in the top, mash the insides with a stick, and then drink the good juice. He digs into the sand with a reed which is a kind of grass with a hollow stem like a drinking straw.

Many of the Bushmen's stories are about animal life on the Kalahari. The Bushmen do not wander across the whole desert alone. To survive, they live together in small bands. Each band has its own territory, which includes a water hole and a vast stretch of land around it. People who are not part of the band must ask permission to enter another band's territory. When a band moves, it goes to another place in its own territory and sets up a new werf. The Bushmen's stories show how they feel about animals.

APPENDIX B

PROSE ANALYSIS OF CONTENT AND MEANING STRUCTURE
OF THE PASSAGE

PROSE ANALYSIS OF THE PASSAGE BASED ON KINTSCH'S SYSTEM

- | | |
|-------------------------------------|---------------------------------------|
| 1. (ISA, KALAHARI, DESERT) | 25. (PART OF, 24) |
| 2. (LOC: <u>IN</u> , 4, 3) | 26. (<u>IN</u> , 25, 26a) |
| 3. (AFRICA, SOUTHWESTERN) | 26a. (AFRICA, SOUTHERN) |
| 4. (Q. OF, 5, 6) | ----- 2 ----- |
| 5. (STRETCH, GREAT) | 27. (ADAPT TO, 28, 29) |
| 6. (LAND, DRY) | 28. (PART OF, 1, PLANTS) |
| 7. (Q. OF, 2, FLAT) | 29. (ENVIRONMENT, DESERT) |
| 8. (POSSESS, 2, 9) | 30. (ISA, 33, 32) |
| 9. (<u>OR</u> : LAKES, RIVERS) | 31. (30, MOST) |
| 10. (NEGATE, 8) | 32. (REF: THESE, 27) |
| 11. (<u>IN</u> , 12, 2) | 33. (<u>AND</u> , BUSHES, GRASSES) |
| 12. (VEGETATION, SCARCE) | 34. (<u>HOWEVER</u> , 31, 41) |
| 13. (ADAPT TO: 14, 17) | 35. (SEE, 4, 38) |
| 14. (LIVE, 15, 16) | 36. (ISA, BAOBOB TREE, 27) |
| 15. (<u>AND</u> , PLANTS, ANIMALS) | 37. (36, 200-FOOT) |
| 16. (REF: HERE, 2) | 38. (37, HUGE) |
| 17. (ENVIRONMENT, 20) | 39. (ACROSS, 35, 40) |
| 18. (WATER, LITTLE) | 40. (1, BARREN) |
| 19. (TEMPERATURES, HIGH) | 41. (TIME OF: 35, EVERY NOW AND THEN) |
| 20. (<u>AND</u> , 18, 19) | 42. (REACH, INTO, 45, SKY) |
| 21. (REF: 22, 1) | 43. (PART OF, 35, 45) |
| 22. (REF: THIS, 2) | 44. (BRANCHES, THICK) |
| 23. (COVERS, 21, 24) | 45. (44, GREAT) |
| 24. (NUMBER OF, NATIONS, THREE) | |

46. (MANNER: LIKE, 42, 47)
47. (ARMS, STRETCHING)
48. (PART OF, 35, 49)
49. (BARK, 50)
50. (AND, THICK, SMOOTH)
51. (SAGS, 49)
52. (TOWARDS, 51, 53)
53. (PART OF, 35, 53)
54. (ADAPT TO, 35, 55)
55. (CLIMATE, 56)
56. (AND, HOT, DRY)
57. (BECAUSE, 54, 58)
58. (STORE, 35, WATER)
59. (IN, 58, 60)
60. (Q. OF: 63, 61)
61. (WOOD, SPONGY)
62. (PART OF, 35, 63)
63. (TRUNK, HUGE)
64. (STORE, 67, WATER)
65. (PLANTS, 66)
66. (REF: OTHER, 27)
67. (65, SOME)
68. (IN, 64, 70)
69. (70, UNDERGROUND)
70. (ROOTS, LARGE)
71. (REST AS, 72, SEEDS)
72. (REF: MANY, 64)
73. (UNTIL, 71, 74)
74. (SEASON, RAINY)
75. (GERMINATE, 71)
76. (NEGATE, 75)
77. (CONDITION OF, 76, 78)
78. (WATER, WITHOUT)
79. (CONDITION OF: BUT, 77, 82)
80. (SPROUT, 71)
81. (80, FINALLY)
82. (WHEN, 83, 81)
83. (FALL, RAIN)
- 3-----
84. (1, RAINLESS)
85. (EXTENT OF: 84, 86)
86. (PART OF, 87, YEAR)
87. (NUMBER OF, MONTHS, TEN)
88. (COME TO, RAINS, [83], 1)
89. (IN, 88, 90)
90. (AND, DEC., JAN., FEB.)
91. (WHEN, 88, 96)
92. (FILL, WATER, 93)
93. (IN, HOLES, GROUND)
94. (FORM, 95)

- | | |
|---------------------------------------|------------------------------------|
| 95. (PONDS, SMALL) | 120. (BEAR, 122, 121) |
| 96. (<u>AND</u> , 92, 94) | 121. (REF: THESE, 112) |
| 97. (99, ACTIVE) | 122. (<u>AND</u> , 118, 119, 120) |
| 98. (REF: DESERT LIFE, 27) | 123. (122, QUICKLY) |
| 99. (98, ALL) | 124. (<u>BECAUSE</u> , 123, 125) |
| 100. (WHEN, 88, 97) | 125. (SEASON, SHORT) |
| 101. (TURN, 102, GREEN) | 126. (GRAZE ON, 127, 128) |
| 102. (ISA, GRASS, 97) | 127. (POSSESS, 1, ANIMALS) |
| 103. (APPEAR ON, 105, 104) | 128. (112, 129) |
| 104. (ISA, BUSH, 197) | 129. (<u>AND</u> , NEW, TENDER) |
| 105. (<u>AND</u> , 106, BLOSSOMS) | 4----- |
| 106. (LEAVES, NEW) | 130. (RETURNS, 131, 132) |
| 107. (<u>AND</u> , 101, 103) | 131. (REF: DROUGHT, DRY TIME) |
| 108. (ADD TO, 109, 111, DESERT SCENE) | 132. (<u>TO</u> : 131, 1) |
| 109. (ISA, 110, 97) | 133. (<u>IN</u> , 130, MARCH) |
| 110. (PLANTS, FLOWERING) | 134. (DRY UP, WATERHOLES [92]) |
| 111. (COLORS, BRIGHT) | 135. (HEDGE: START TO, 134) |
| 112. (SPROUTS FROM, 114, 115) | 136. (WHEN, 137, 135) |
| 113. (REF: PLANT LIFE, 97) | 137. (STOP, RAIN [88]) |
| 114. (113, MUCH) | 138. (BECOME, 139, 140) |
| 115. (REST, SEEDS) | 139. (REF: THEY, 137) |
| 116. (WHILE, 115, 117) | 140. (MUD, SLIPPERY) |
| 117. (WAIT FOR, SEEDS, MOISTURE) | 141. (BECOME, 139, 142) |
| 118. (BUD, 121) | 142. (143, CAKED) |
| 119. (BLOSSOM, 121) | 143. (EARTH, WHITE) |

144. (THEN, 138, 141)
 145. (REMAIN, [are left], 147)
 146. (134, LITTLE)
 147. (152 , ONLY)
 148. (IN, 147, 149)
 149. (GROUND, DEEP)
 150. (COVER WITH, 4, 146, 151)
 151. (GRASS, LONG)
 152. (AND, 148, 150)
 153. (BY, 145, JUNE)
 154. (155, 156)
 155. (REF: APART)
 156. (MILES, APART)
 157. (IN, TRAVEL, 1)
 158. (157, IMPOSSIBLE)
 159. (158, NEARLY)
 160. (WHEN, 157, 163)
 161. (DRY UP, 134)
 162. (161, COMPLETELY)
 163. (IN, 162, AUGUST)

168. (TALL, 169)
 169. (NUMBER OF: FEET, 4 1/2 to 5)
 170. (WHEN, 167, ADULTS)
 171. (LIVE ON, 172, 174)
 172. (REF: THESE, 165)
 173. (GRASSLANDS, RICH)
 174. (LOC: SOUTH, 173, 1)
 175. (DRIVE, 177, 165, NORTH)
 176. (FIGHT, 165, 177)
 177. (PEOPLE, CATTLE-RAISING)
 178. (PURPOSE OF: 176, 173)
 179. (BECAUSE, 176, 175)
 180. (SETTLE, 181, 1)
 181. (REF: THEY, 165)
 182. (BECAUSE: 179, 180)
 183. (FLEE FOR, 165, SAFETY)
 184. (LIVE, 165)
 185. (184, STILL)
 186. (MANNER, AS, 185, 187)
 187. (PEOPLE, 188)
 188. (AND, HUNTING, GATHERING)
 189. (MANNER OF: AS, 187, 190)
 190. (LIVE, 1972)
 191. (PEOPLE, EARLIEST)
 192. (191, ON EARTH)

5-----

164. (LIVE, 165, 1)
 165. (ISA, BUSHMEN, PEOPLE)
 166. (165, SMALL)
 167. ((EXTENT OF, 166, 168)

6-----

- 193. (PLANT, 164, CROPS)
- 194. (HERD, 164, ANIMALS)
- 195. (OR, 193, 194)
- 196. (NEGATE, 195)
- 197. (BECAUSE, 198, 196)
- 198. (199, HARCH)
- 199. (CONDITIONS, 1)
- 200. (INSTEAD, 197, 204)
- 201. (GATHER, 202, 205)
- 202. (REF: THEY, 164)
- 203. (AND, ROOTS, NUTS, BERRIES)
- 204. (AND, 201, 205)
- 205. (HUNT, 202, ANIMALS)
- 206. (MOVE, 164, 207)
- 207. (PLACE, NEW)
- 208. (WHEN, 211, 206)
- 209. (WATERHOLES, DRY)
- 210. (IN, 209, ONE PLACE)
- 211. (AND, 210, 212)
- 212. (REMAINS, 213)
- 213. (FOOD, LITTLE)
- 214. (MOVE, 215)
- 215. (REF: THESE, 201)
- 216. (214, A GREAT DEAL)

- 217. (BECAUSE, 218, 216)
- 218. (SEARCH FOR, 215, 219)
- 219. (AND, FOOD, WATER)
- 220. (STAY, 222, 223)
- 221. (NEGATE, 220)
- 222. (REF: THEY, 216)
- 223. (SPOT, ONE)
- 224. (BUT, 221, 225)
- 225. (MIGRATE FROM, 222,
PLACE TO PLACE)
- 226. (ISA, 227, NOMAD)
- 227. (REF: SUCH, 224)

7-----

- 228. (SET UP, 229, 231)
- 229. (BAND, 230)
- 230. (NUMBER OF BUSHMEN, TWENTY)
- 231. (ISA, WERF, 232)
- 232. (WORD FOR, CAMP)
- 233. (WHERE, 234, 228)
- 234. (FIND, 229, 235)
- 235. (AND, FOOD, WATER)
- 236. (WALK THROUGH, VISITOR, 231)
- 237. (239, PROBABLY)
- 238. (KNOW, VISITOR, 236)
- 239. (NEGATE, 238)
- 240. (BECAUSE, 239, 241)

241. (LOOK LIKE, 242, BUSHES)
242. (HOUSES, 243)
- 242a. (MAKE, 242)
- 242b. (AND, STICKS, GRASSES)
243. (AND, SMALL, CONE-SHAPED)
244. (LIVE IN, BUSHMEN, 245)
245. (REF: THESE SKERMS, 241)
246. (AND, 249, 252)
247. REF: THEM, BUSHMEN)
248. ((GIVE, 245, 247, SHADE)
249. (DURING, 248, DAY)
250. (SHELTER FROM, 245, 247, 251)
251. (WINDS, COOL)
252. (AT, 250, NIGHT)
253. (PLACE, 4, 255)
254. (253, CAREFULLY)
255. (ROW, 261)
256. (EGGSHELLS, OSTRICH)
- 256a. (LOC: NEAR, 253, 244)
257. (DECORATE WITH, 4, 256, 261)
258. (DESIGNS, 259)
259. (AND, ZIGZAGS, DIAMONDS)
260. (PICTURES, ANIMAL)
261. (OR, 258, 260)
262. (255, IMPORTANT)
263. (BECAUSE: 264, 262)
263. (BECAUSE: 264, 262)
264. (HOLD, 265, WATER)
265. ((REF: THEY, 261)
266. (FILL THROUGH, 4, 267, 268)
267. (REF: EACH ONE, 261)
268. (CUT IN, 4, HOLE, @cL)
269. (STOP UP, 4, 268, GRASS)
270. (THEN: 266, 269)
-
271. (ISA, 274, 273)
272. (TASK, DESERT SURVIVAL)
273. (272, MAIN)
274. (FIND, 4, 275)
275. (AND, FOOD, WATER)
276. (KNOW, 164, LAND)
277. (276, WELL)
278. (SEARCH, 164, 280)
279. (SOURCES, WATER)
280. (279, NEW)
281. (WHEN, 282, 278)
282. (DRY UP, WATERHOLES)
283. (FIND, 283a, WATER)
- 283a. (NUMBER OF, 164, ONE)
284. (WHERE, 283, 285)
285. (THINK, 286, 287)

- 286. (ELSE, NO ONE)
- 287. (LOOK, 286)
- 288. (WALK TO, 289, 292)
- 289. (REF: HE, 283)
- 290. (EXTENT OF: 289, 291)
- 291. (FEET, FEW)
- 292. (BUSH, LITTLE)
- 293. (AND, 288, 294)
- 294. (PULL OUT, 289, 295)
- 295. (MELON, TSAMA)
- 296. (MAKE, 289, HOLE, 297)
- 297. (IN, TOP, 295)
- 298. (MASH, 289, 299, STICK)
- 299. (PART OF, 295, INSIDES)
- 300. (AND, 296, 299)
- 301. (THEN, 302, 300)
- 302. (DRINK, 289, 303)
- 303. (PART OF, 295, 304)
- 304. (JUICE, GOOD)
- 305. (EAT, 4, 307)
- 306. (PLANTS, OTHER)
- 307. (ISA, 312, 306)
- 308. (ISA, BI, ROOT)
- 309. (ISA, GA, ROOT)
- 310. (AND, 308, 309)
- 311. (CUCUMBER, WILD)
- 312. (AND, 310, 311)
- 313. (PURPOSE OF: 305, 314)
- 314. (POSSESS, 307, JUICE)
- 315. (GET FROM, 289, WATER, SIPWELLS)
- 316. (REF: 315, 305)
- 317. (ANOTHER WAY, 316)
- 318. (HOLD, 319, 320)
- 319. (SAND, MOIST)
- 320. (WATER, RAIN)
- 321. (318, SOME PLACES)
- 322. (BELOW: 321, SURFACE)
- 323. (322, THREE TO FOUR FEET)
- 324. (DIGS, 289, SAND, 326)
- 325. (ISA, REED, GRASS)
- 326. (PART OF, 325, 328)
- 327. (STEM, HOLLOW)
- 328. (LIKE, 327, 329)
- 329. (STRAW, DRINKING)
- 330. (SUCKS THROUGH, 289, WATER, 326)
- 331. (STORES IN, 289, 330, 332)
- 332. (EGGSHELL, OSTRICH)
- 333. (THEN, 330, 331)
- 334. (WORKS, 289, 336)

- 335. (334, HARD)
- 336. (GET, 289, 337)
- 337. (REF. 338, 271)
- 338. (NECESSITY, SURVIVAL)

9-----

- 339. (WANDER ACROSS, 164, 341)
- 340. (NEGATE, 339)
- 341. (DESERT, WHOLE)
- 342. (340, ALONE)
- 343. (LIVE TOGETHER, 344)
- 344. (REF: THEY, 164)
- 345. (MANNER: IN, 343, 346)
- 345a. (LET UP, 345, b)
- 345b. (WERF, NEW)
- 345c. (AND, 355a)
- 346. (BANDS, SMALL)
- 347. (PURPOSE OF, 345, 348)
- 347a. (POSSES, 347, TERRITORY)
- 348. (SURVIVE, 164)
- 348a. (PART OF, 347a)
- 349. (MUST ASK, 351, 353)
- 349a. (LOC., AROUND, WATERHOLE, 350)
- 350. (PART OF, PEOPLE, 347)
- 350a. (LAND, 351)
- 351. (NEGATE, 350)

- 351a. (STRETCH, VAST)
- 352. (PERMISSION, 353)
- 353. (ENTER, 351, 354)
- 354. (POSSESS, 347a, TERRITORY)
- 355. (GOES TO, 347, 357)
- 356. (PLACE, ANOTHER)
- 357. (IN, 356, 354)
- 358. (WHEN, 359, c)
- 359. (MOVES, 346)

CONTENT STRUCTURE - THE KALAHARI DESERT

(Analysis of Passage Based on Meyer's Top-Level Structural Analysis)

THE KALAHARI DESERT, attributionsetting location

IN SOUTHWESTERN AFRICA THERE IS A GREAT STRETCH OF DRY LAND

attribution

THE LAND IS FLAT WITH NO LAKES OR RIVERS

collectionattributionspecific

VEGETATION IS SCARCE

specific

THE PLANTS THAT LIVE HERE HAVE ADAPTED TO AN

ENVIRONMENT WITH LITTLE WATER AND HIGH TEMPERATURES

equivalent

THIS LAND IS THE KALAHARI DESERT

setting location, range

THE KALAHARI DESERT COVERS PART OF THREE NATIONS OF

SOUTHERN AFRICA

attribution

THE PLANTS OF THE KALAHARI HAVE ADAPTED TO THE DESERT ENVIRONMENT

constituency identification

MOST OF THESE PLANTS ARE GRASSES AND BUSHES

adversative

HOWEVER, EVERY NOW AND THEN ACROSS THE BARREN DESERT A
HUGE, ZOO-FOOT BAOBAB TREE IS SEEN.

attribution

ITS GREAT THICK BRANCHES REACH LIKE STRETCHING ARMS INTO
THE SKY

attribution

THE BARK IS THICK AND SMOOTH, AND SAGS IN FOLDS TOWARD
THE BOTTOM OF THE TREE

specific

THE TREE IS ADAPTED TO THE HOT, DRY CLIMATE BECAUSE IT IS
ABLE TO STORE WATER IN THE SPONGY WOOD OF ITS HUGE TRUNK.

specific

SOME OF THE OTHER DESERT PLANTS STORE WATER IN LARGE
UNDERGROUND ROOTS.

specific

MANY REST AS SEEDS UNTIL THE RAINY SEASON

explanation

THE SEEDS CANNOT GERMINATE WITHOUT WATER, BUT WHEN THE RAIN
FALLS, THE SEEDS CAN FINALLY SPROUT.

attribution

THE DESERT IS WITHOUT RAIN FOR ALMOST 10 MONTHS OF THE YEAR

antecedent, setting time

RAINS COME TO THE KALAHARI IN DECEMBER, JANUARY, AND FEBRUARY.

consequent

AT THIS TIME, HOLES IN THE GROUND FILL WITH WATER, AND
SMALL PONDS FORM

consequent, attribution

ALL OF THE DESERT LIFE BECOMES ACTIVE WITH THE COMING
OF THE RAINS.

collectionspecific

THE GRASS TURNS GREEN, AND NEW LEAVES AND BLOSSOMS
APPEAR ON THE BUSHES.

FLOWERING PLANTS ADD BRIGHT COLORS TO THE DESERT SCENE

explanation, antecedent

MUCH OF THE PLANT LIFE SPROUTS FROM SEEDS THAT HAVE
RESTED WHILE WAITING FOR MOISTURE.

consequent

THESE PLANTS BUD, BLOSSOM, AND BEAR THEIR SEEDS
QUICKLY FOR THE SEASON IS SHORT.

evidence

THE ANIMALS OF THE KALAHARI GRAZE ON THE NEW, TENDER
PLANTS BROUGHT TO LIFE BY THE LONG-AWAITED RAINS.

setting trajectory, antecedent

IN MARCH, THE DROUGHT, OR DRY TIME, RETURNS.

collection,consequent

WHEN THE RAINS STOP, THE WATER HOLES START TO DRY UP

specific, attribution

THEY BECOME SLIPPERY MUD AND THEN CAKED WHILE EARTH.

BY JUNE ONLY LITTLE WATER HOLES WHICH ARE DEEP IN THE GROUND
AND COVERED WITH LONG GRASS ARE LEFT.

specific, attribution

THESE WATER HOLES ARE MILES APART, AND TRAVEL IN THE DESERT
IS NEARLY IMPOSSIBLE WHEN THE WATER HOLES COMPLETELY DRY
UP IN AUGUST.

attribution

THE KALAHARI DESERT IS THE HOME OF PEOPLE CALLED BUSHMEN.

attribution

THE BUSHMEN ARE RATHER SMALL PEOPLE

specific

AS ADULTS, THEY ARE FOUR AND ONE-HALF TO JUST OVER FIVE FEET
TALL

setting trajectory

THESE PEOPLE ONCE LIVED ON RICH GRASS LANDS SOUTH OF THE
KALAHARI.

antecedent

IN A WAR WITH CATTLE-RAISING PEOPLES FOR THE GRASSLANDS,
THE BUSHMEN WERE DRIVEN NORTH.

consequent

FLEEING FOR SAFETY, THEY SETTLED ON THE KALAHARI DESERT.

attribution, manner

AS A HUNTING AND GATHERING PEOPLE STILL LIVE AS THE
EARLIEST PEOPLE ON EARTH ONCE DID.

attribution, antecedent-consequent

BECAUSE OF THE HARSH DESERT CONDITIONS THE BUSHMEN DO NOT PLANT
CROPS OR HERD ANIMALS.

adversative

INSTEAD, THEY GATHER ROOTS, BERRIES, AND NUTS, AND HUNT ANIMALS.

explanation

WHEN THE WATERHOLES IN ONE PLACE ARE DRY AND LITTLE FOOD
REMAINS, THE BUSHMEN MUST MOVE TO A NEW PLACE

equivalent

IN THEIR SEARCH FOR FOOD AND WATER, THESE PEOPLE MUST MOVE
A GREAT DEAL.

equivalent

THEY DO NOT STAY IN ONE SPOT BUT MIGRATE FROM PLACE
TO PLACE

replacement identification

SUCH PEOPLE ARE CALLED NOMADS

setting trajectory

WHERE FOOD AND WATER CAN BE FOUND, A BAND OF ABOUT 20 BUSHMEN SET UP A WERE, WHICH IS THEIR WORD FOR CAMP.

attribution

A VISITOR COULD PROBABLY WALK THROUGH A WERE WITHOUT KNOWING IT BECAUSE THE SMALL, CONE-SHAPED HOUSES MADE OF STICKS AND GRASS LOOK MUCH LIKE BUSHES.

collectionattribution

THE BUSHMEN LIVE IN THESE SKERMS WHICH GIVE THEM SHADE DURING THE DAY AND SHELTER FROM THE COOL WINDS AT NIGHT. NEAR THE HOUSES IS A CAREFULLY PLACED ROW OF OSTRICH EGGSHELLS, OFTEN DECORATED WITH CARVED DESIGNS OF ZIGZAGS AND DIAMONDS, OR ANIMAL PICTURES.

explanation

THE EGGSHELLS ARE IMPORTANT BECAUSE THEY HOLD WATER

specific

EACH ONE IS FILLED THROUGH A HOLE CUT IN THE SHELL.

specific

THE HOLE IS THEN STOPPED UP WITH GRASS.

attribution

THE MEAN TASK OF DESERT SURVIVAL IS FINDING FOOD AND WATER

attribution

THE BUSHMEN KNOW THE LAND WELL

antecedent-consequent

WHEN THE WATER HOLES DRY UP, THE BUSHMEN MUST SEARCH FOR NEW SOURCES OF WATER.

equivalent

A BUSHMEN CAN FIND WATER WHERE NO ONE ELSE WOULD THINK TO LOOK.

collectionevidence

HE MIGHT WALK A FEW FEET TO A LITTLE BUSH AND PULL OUT A TSAMA MELON.

manner

HE WOULD MAKE A HOLE IN THE TOP, MASH THE INSIDES WITH A STICK AND THEN DRINK THE GOOD JUICE.

evidence

OTHER PLANTS SUCH AS THE BI AND GA ROOTS AND THE WILD CUCUMBER MAY BE EATEN FOR THEIR JUICE.

evidence

ANOTHER WAY A BUSHMAN CAN GET WATER IS FROM SIP WELLS

explanation

IN some places, rain water is held in the moist sand.

specific

THE WATER IS THREE TO FOUR FEET FROM THE SURFACE.

CollectionManner

AT SUCH PLACES THE BUSHMAN DIGS INTO THE SAND WITH A REED, WHICH IS A KIND OF GRASS WITH A HOLLOW STEM LIKE A DRINKING STRAW.

HE SUCKS WATER THROUGH THE REED AND THEN STORES
THE WATER IN AN OSTRICH EGGSHELL

attribution

THE BUSHMAN WORKS HARD TO GET THIS NECESSITY FOR SURVIVAL.

attribution, manner

THE BUSHMEN DO NOT WANDE? ACROSS THE WHOLE DESERT ALONE

explanation

TO SURVIVE THEY LIVE TOGETHER IN SMALL BANDS.

attribution

EACH BAND HAS ITS OWN TERRITORY, WHICH INCLUDES A
WATER HOLE AND A VAST STRETCH OF LAND AROUND IT

attribution

PEOPLE WHO ARE NOT PART OF THE BAND MUST ASK PERMISSION
TO ENTER ANOTHER BAND'S TERRITORY.

setting trajectory

WHEN A BAND MOVES, IT GOES TO ANOTHER PLACE IN ITS OWN
TERRITORY AND SETS UP A NEW WERF.

APPENDIX C

QUESTIONNAIRE

QUESTIONNAIRE

- | | | |
|---|-------|-------|
| 1. Did you try to remember the ideas in the passage word for word? | YES | NO |
| 2. Did you try to "sound out" unfamiliar words to help you understand them? | YES | NO |
| 3. Did you ever reread anything in the passage? | YES | NO |
| 3A. When you reread, did you reread a whole paragraph or just parts of a paragraph? | WHOLE | PARTS |
| 3B. Did you reread to help you remember information? | YES | NO |
| 3C. Did you reread because you didn't understand something? | YES | NO |
| 4. Did you remember ideas that were interesting to you more than other ideas? | YES | NO |
| 5. Did you ever ask yourself questions about what you read? | YES | NO |
| 6. Do you think this passage was easy or hard to read? | EASY | HARD |
| 7. Did you know anything about the Kalahari Desert before you read this passage? | YES | NO |
| 8. Had you ever heard about the Bushmen before? | YES | NO |
| 9. Do you think you are a good reader? | YES | NO |
| 10. Do you think you are a good student? | YES | NO |
| 11. Did you need any special skills to be able to read this passage? | YES | NO |
| 12. Did you use information(ideas) from the first part of the passage to help you understand information (ideas) in later parts of the passage? | YES | NO |
| 13. Did you look for important ideas while you read? | YES | NO |

- | | | |
|--|-----|----------------|
| 14. Did you look for one sentence that stated the most important idea in a paragraph when you read? | YES | NO |
| 15. Did you look for ideas that might be a test when you read? | YES | NO |
| 16. Did you think about the ideas in your mind while you read? | YES | NO |
| 17. Did you try to understand information that was new to you by comparing it to something you already know? | YES | NO |
| 18. Did you repeat ideas in your mind to help you remember them? | YES | NO |
| 19. Did you get pictures in your mind when you read? | YES | NO |
| 20. Did you read some of the paragraphs more slowly than others? | YES | NO |
| 21. Did you try to remember all of the ideas or only the important ones? | ALL | IMPOR-
TANT |

APPENDIX D

RECALL TEST-PROBES

PROBE QUESTIONS

Tell me everything you can remember about

1. The land and location of the Kalahari Desert
2. The plants of the Kalahari Desert
3. The Bushmen of the Kalahari Desert
4. The Bushmen's camps
5. How Bushmen find water
6. The Bushmen's territories

APPENDIX E

EXAMPLE PARAGRAPH USED TO CLARIFY DEFINITIONS

EXAMPLE

Saw I sort one sea big a to all. Were there fish sea of
animals all there turtles and sharks. Animals the saw I.

Huge a looked I pool green.

Then I saw some funny animals jumping in and out of their
pool. They were sea lions.

APPENDIX F

PRACTICE PARAGRAPHS

NORMAL TEXT - PRACTICE PARAGRAPH

In the past, more than enough food was produced by people growing crops and raising animals. This extra food, or surplus, was then traded for things made, gathered, or hunted by people who were not farmers. Over the years, more and more people have not had to find or grow their own food to live. They trade their work for money and buy food. Industry is the use of tools and machines to make products, such as cars, clothing, air-conditioners, and houses. An industrial culture is one in which people depend upon machines.

DISRUPTED TEXT - PRACTICE PARAGRAPH

In the past, more than enough food was produced by people growing crops and raising animals. An industrial culture is one in which people depend upon machines. This extra food, or surplus, was then traded for things made, gathered, or hunted by people who were not farmers. Over the years, more and more people have not had to find or grow their own food to live. They trade their work for money and buy food. Industry is the use of tools and machines to make products, such as cars, clothing, air-conditioners, and houses.

APPENDIX G

SAMPLE PROTOCOLS

KEY TO ABBREVIATIONS AND SYMBOLS IN SAMPLE PROTOCOLS

GQ = General Question

P1-P5 = Probe Question
(Listed on or see page 77)

CP = Clarifying probe question

IDK = I don't know response

KD = Kalahari Insert

Subject 1 - Poor Reader
 Disrupted Text
 Lisa Qimoen Disrupted Text
 2/20/80

PARAGRAPH 1

GQ: What did you do?

IDK. Just read over it. And, you know, read the places, you know, they're certain places I kind of caught them more **Ten**

P1: Which ideas?

Nothing..probably the ones' that didn't have, you know, like the names of places.

CP: Can you show me which sentences?

"The plants and animals that...."

CP: Why that one?

No, that's one that I didn't pay attention to

CP: Why not?

I don't know. But like these sentences down here, I paid more attention to because they're places.

CP: Which sentences?

"The land of the KD covers..."

P2: Why that sentence?

Because...to know about the places they're talking about.

P3: Is there anything you should do when you study that you didn't do with this paragraph?

Probably read it more than I did.

CP: What do you mean by read more?

Read it over again

P4: What would a younger student need to be able to do to understand and study that paragraph?

Know what the words mean.

CP: For example?

Adapted

CP: How would it help to know that?

Like when you read it tells you what the sentence means when you know the words.

P5: If you were going to change the paragraph to make it easier or better, how would you change it?

Have easier words

CP: Other words you change besides adapted?

Environment

CP: What would you change environment to?

IDK

P6: How?

So they'd know what it means.

PARAGRAPH 2

GQ: How did you go about

(long sigh) Gosh! IDK

P1: Which words or sentences

Well, this one I don't even know what it was (baobab). So I paid attention to that and the first one I paid attention to (The plants of the KD)

P2: Why those ideas?

Cause I didn't know how to pronounce that one..bao...And this is like the main idea.

CP: The first sentence?

Yeah

CP: How did you know that?

Cause it tells, it's like what it...I don't know how to put this...it tells like what this paragraph is about.

Two

P3: Normally do/didn't

Read over

CP: How does reading it over help?

Makes you remember it better

P4: What need to be able...

Know the words

P5: What change...

Easier words

CP: For example?

Environment again.

PARAGRAPH 3

GQ: What did you do...

Just paid attention to it.

P1: Which ideas...

Like what...when it tells about the animals.

CP: Can you show me which sentences you're talking about?

Well, I paid attention to the first one and the second one...the one that says "The grasses....." and "The animals of the KD....."

P1: Why those?

Cause they were interesting

Ten

CP: Why the first sentence?

It's the main idea

Two

CP: Why the second?

Cause it gives me information

CP: What information?

That the desert is without rain for 10 months

CP: Why is that an important thing to know?

Well, like, if you were studying the desert and had to give a report you could tell them that.

CP: What about "The grassess...."

IDK

CP: What about "The animals of the KD graze...?"

Cause it tells where they graze

P3: Normally do/didn't

Read over

P4: What advice....

Read it over, you know, more than once until they get what it means. And if they have any hard words, you know, look them up or ask someone what they mean.

CP: Were there any hard words in this one?

No

P5: What change...

Like more information that's more interesting

P6: How better or easier?

Well, if they don't like it...their mind might wander.

PARAGRAPH 4

GQ: What did you do...

Paid attention to it

P1: Which ideas...

The one that says "By June only...."

P2: Why that and not the first sentence

IDK.. Because it's more interesting, I think.

Ten

P3: Should do/didn't

Read over again

P4: What need to know how to do...

Know what the words mean

CP: Any words in particular?

Drought

CP: Could they figure out what drought meant?

I doubt it.

CP: Is there anything in the paragraph that might help them?

Yeah, rain.

P5: What change...

IDK

PARAGRAPH 5

GQ: What did you do to...

Pay attention

P1: Which ideas...

The second sentence

CP: Why that

Cause it tells what they are

P2: Why not the last sentence?

I think the second one was more interesting

Ten

P3: Normally do/didn't do

Read over it

P4: What advice...

Read over it more than once. And maybe they could read it with some one.

CP: How would that help?

Like if they didn't know what something meant...they could have them help

P5: What change...

IDK

PARAGRAPH 6

GQ: How did you go about...

Paid attention to it...

P1: Which ideas didn't you pay much...

Nothing

CP: Then which did you...

Nothing in particular

P3: Should do/didn't

Read over it more than once.

P4: What advice...

Pay attention to certain things

CP: What things would you tell them to pay attention to?

IDK..."Such people are called nomads."

CP: Why that?

So they know what they're talking about

CP: How could they figure out what nomads were?

In that sentence..it says "people."

CP: Does that explain nomads?

IDK

P5: What change...

Have it described what they are

P6: How better/easier

So they'd know what they are

PARAGRAPH 7

GQ: How did you go about...

Pay attention to it.

P1: Which ideas...

The first sentence

P2: Why that and not "Near the houses is..."

Cause then you know what a werf is

One

P3: Normally do/didn't

Read over

P4: What advice...

Pay attention to it, and maybe be in a quiet place where they could read

P5: What change...

Easier words

CP: For example?

Werf....skerms

CP: What would you change werf to?

IDK

CP: Do you have any idea what werf means?

Well, it might be a house

CP: What about skerms?

That's a house

CP: How did you figure out skerms was a house?

Cause it said that they live in it.

CP: So what about werf?

IDK, it says "which is their word for summer."

PARAGRAPH 8

GQ: What did you...

Paid attention

P1: Which ideas...

The second sentence...and the first one

P2: Why those and not "Another way a bushman..."

IDK

P3: Normally do/didn't

Read more and maybe look over some words

CP: Which words?

IDK how to pronounce it (tsama) and bi and ga roots

CP: Why do you think you should have looked over those more?

So you'd know what they are

CP: Did you figure out what they were

They're roots and it's a melon, a certain kind

P4: What need to be able...

Know what the words are

CP: How could you help them?

Look them up.

P5: What change...

Put in easier words..

PARAGRAPH 9

GQ: What did you do...

Paid attention...

P1: Which ideas...

The first sentence and the third one "Each band has it's own territory."

P2: Why those?

IDK...they give you information.

Ten

P3: Should do/didn't

Read over it.

P4: What advice...

Read over it more until you understand it. And if they had words they didn't know..pay more attention to them and try to figure them out.

P5: What change...

Easier words...

CP: For example?

Territory...for a younger student

CP: Do you think they could figure it out....

Probably..cause it says where they live and it says they're together. And then to enter another bands territory they have to ask permission.

Subject 2 - Good Reader
Disrupted Text

PARAGRAPH 1

GQ: What did you do..

I just read it twice first of all. And then I tried to really think about what I was reading.

Eight

P1: Which ideas..

Not a whole lot, but some of the, it said "There's no lakes or rivers" so things can't really live very well, and vegetations is scarce so they couldn't really eat.

P2: Why those and not "The KD covers part of..."

Well, it's talking about the animals and what they're drinking and eating, and stuff, so it doesn't matter a whole lot where it is.

P3: Normally do/didn't do

I don't think so

P4: What need to be able...

Well, if they went over...I'd read it about three times, or I even read it more than that sometimes on a test. And if there were any words that they don't understand, look them up in the dictionary or something to find out what they are so they know what they're reading.

CP: How does reading over help

It explains things to you, clarifies them in your mind.

P5: What change

Well, I'd probably start out like, "In the KD, some desert animals seek water in surprising places..and then that way that's just an example so that might be up a little.

CP: What?

Well, it sort of doesn't sound right way at the end..
Usually they end with "many of the desert animals die."
or something like that.

PARAGRAPH 2

Q: How did you go about...

Well, you sort of, like I read over it three times and the first **Seven**
time you read it real in detail and get everything, and then the
next couple of times you just sort of almost skim over to get
the main points.

CP: What main points?

One of them was this baobab tree and the climate.

CP: What sentence are you talking about for the climate?

Like the tree is adapted to the hot climate
And, the first sentence is pretty important too.

P1: Why about the baobab tree?

Well, it's about the main idea of the paragraph

CP: How did you know that?

Well, since they started it, about the whole rest of **Two**
the paragraph was about that one tree.

CP: Why the first sentence?

Well they have to tell where it is, because I've never
heard of a baobab tree before. There isn't any around
here.

P2: Why those and not "Some of the desert plants store..."

Well, that's sort of general. And, that sort is sort of
mixed in when they're talking about the baobab tree.

C: What do you mean?

Well, they're taking on....they're sitting here talking
about the baobab tree and they just all of a sudden stick
in the thing about other plants.

P3: Should do/didn't do.

I don't think so.

P4: What advice

Well, read it over about two or three times. And make sure that they understand all of the words. And...that's about it I think.

CP: How would they know if they understood or not?

Well, if they've heard it before and they...like if they heard baobab, they'd think "I've never heard that before."

CP: What should they do to figure out...

They should look it up in a dictionary or they could ask an adult.

P5: What change...

Well, I'd take that "Some of the other desert...." and put it so that it's not right in the middle of the talking about the baobab tree. Maybe put it right above the baobab tree like so the baobab tree would be an example of that.

P6: How help.....

Well, you know, if you say like there are some desert plants that store water in roots and then the baobab tree would be an example. And usually that helps to understand..helps a person to understand the paragraph.

PARAGRAPH 3

GQ: What did you do to...

I read it three times, I skimmed over it real quick for a fourth
time because it's a little bit longer than the other ones were.
And, the first time I read it real...tried to think about it a lot
and then skimmed over it later, lighter and lighter just to get
the main points.

Seven

P1: What were you thinking about?

The rains only ten months of the year....and all the blossoming and stuff cause it's usually not green like that and all the vegetation.

P2: Why those ideas and not the months that the rains come?

Well, it mostly talks about the desert without rain. And then most of the paragraph is about the blossoming and all of the animals coming to life and being active and everything, so it's more about that than about December, January, and February. Two

P3: Should do/didn't do.

I don't think so.

P4: What need to be able....

Just read it over a couple of times. And like any animals that they...any words that they didn't understand, like, graze, to find out what it meant by the dictionary or another person, an adult or whatever. And, let's see, just to...try to understand it as much as they can.

P5: What change...

Let's see...well, the last two sentences. They, it sort of seems like the paragraph should end with the sentence "These plants bud blossom and bear their seeds quickly for the season is short." You'd think that would be the end, but then they go to talk about what they eat.

CP: So what would you do?

I'd probably just cut out the last two sentences, or else maybe...I guess it really would fit up here either...

P6: How easier?

Well, you know, you get sort of going into the paragraph and then there's some kind of end to it. And that seemed like the end to and then it just goes on without having an end to it like.

PARAGRAPH 4

GQ: What did you do..

This is pretty short, so I only read it twice. And just tried to think about it while I was reading, not just read it and go in one ear and out the other.

P1: Which ideas...

P2: Why the first sentence and not "By June little...."

OK, well, you could hear that, but you think what's related with that. We're not talking about much other things related to that

CP: I'm not sure I understand what you're saying

{ Well, if you didn't have the first sentence, and you read that in just another paragraph you'd think well what's that related to this paragraph. I mean it doesn't have anything to do with it. But it does here because of the first sentence. Two

P3: Should do/didn't

No

P4: What need to be able...

To understand all the words and just think about what they're reading not just let it go through their head and make sure ...and just make sure they know all the words is about all I think.

P5: What change...

Well, all of a sudden it says "Very large birds....." that sort of is not related to the paragraph. It's talking about the drought and then that pops in.

P6: How better if took out?

That sort of throws your mind off track.

PARAGRAPH 5

GQ: What did you do to...

OK, I looked through it. And then I came to the word Bushmen, and it was capitalized, so I thought it must be pretty important. That's what I do a lot. If they're capitalized, they usually have something pretty important in them. Ten

CP: All capitalized words?

Well, not all, but let's say like a river or something that's capitalized but it may not be real important..and you try to understand what you're reading and not just look at it.

CP: How do you try to understand?

Well, the paragraphs are pretty easy. Most of the words, I've already heard and been familiar with before, so it's not too hard..and just read it a couple of times.

P1: Which ideas...

The Bushmen, the first sentence.

P2: Why that sentence and not the last one?

Well, usually the first sentence is like a base sentence. It sort of tells what the whole paragraph is going to be mostly about. Two

CP: Did it do it here?

Yeah

P3: Should do/didn't do

No I don't think so.

P4: What have to know how to do...

Well, they'd have to be able to skim..I do I skim. And... just to familiarize the words in their minds.

CP: Any words they'd have trouble with?

Fleeing, maybe, cause I haven't heard it just in a couple of recent years, you know, usually they just say running for safety or getting away.

P5: What change...

I think it's pretty good as it is.

PARAGRAPH 6

GQ: How did you go about trying...

Well, I read it a couple of times, and then I tried to understand the harder words.

CP: Any words in particular?

Well, migrate, I haven't heard it a lot. I know what it means, but..and nomads.

CP: What did you do to understand them?

Well, you look at the context of the sentence and see what surrounds it, so like "They don't stay in one spot but..." that sort of means that they have to move. And nomads, I just thought that was probably the name of what they were for moving to place to place.

One

P2: Why those ideas and not the first sentence?

That was...it didn't, IDK, it just didn't ring a bell in my mind right away. Usually the first sentence does, but that for some reason didn't.

P3: Should do/didn't.

No

P4: What advice...

Well, make sure you know the words, cause if you don't know what you're reading it's not much of a help.....

CP: What could you tell them to help them figure out...

Well, use a dictionary

CP: Would they have to use a dictionary with this paragraph?

There's always books on nomads and things like that

P5: What change...

I think it sounds pretty good the way it is.

PARAGRAPH 7

GQ: How did you go about...

Well, I read it twice. And then I ran onto a couple of words that I never heard before. One of them was werf, and the other one was skerms. And then I just looked at the other parts of the sentence to try to figure out what it could mean.

Sight.

One

CP: Did you figure out the meaning of werf?

Well, it sort of has a definition in here, actually to me it sounded sort of like a teepee...the coneshaped houses made of sticks and grass.

CP: What about skerm?

It says they shelter them, so it must be some kind of shelter.

P2: Why those ideas and not "Near the houses is..."

Well, mostly because I didn't know the words. I was sort of curious about what they were. And "Near the houses...that's sort of, you know you hear that sentence or that type of sentence a lot so it seems sort of general and not real exciting.

P3: Normally do/didn't

No

P4: What advice...

Well, try to find out what werf and skerms mean. And if there was like a direct, just another name for them that they knew, they could substitute that for the word that's in there it might be a lot easier.

P5: Other changes?

I don't think so.

PARAGRAPH 8

GQ: How did you go about...

You look for mostly for the capitalized words cause those are Ten
usually main words. But the Bushmen, I'd heard before. And...
look for the words that you didn't understand.

CP: Were there any?

Like the tsama melon and the bi and ga roots and I think that's about all.

CP: Could you figure out what they meant?

Well, it just says melon right there so it must be some kind One
of like a fruit or something, and the roots just like the
roots of a plant.

P2: Why those ideas and not "Another way a Bushman can get water..."

That was...down here. And I did pay attention to that but it was you know, it was just another part of the second part of the paragraph about the wells, the holes of water.

P3: Normally do/didn't

No

P4: What need to be able...

Well, find out if they didn't know, like what a melon was, to find out what that was, like they might have thought it was a vegetable or something. And that's about all I think.

P5: What change...

Well, there's a part right here, "He might walk a few feet to a little.....that's sort of not on the tract of what we're talking about and then down here it say "He would make a little hole in the tops....that isn't really related to what we're talking about either.

CP: So what would you do..

Probably just take those out because they don't really make any sense in the paragraph because it's talking about 3-4 feet from the surface, and then if you just

skip that one sentence and then go to "In some places, that sounds better then. And that's the same with this one down here. "The Bushman works hard...."And then if you just skipped to he digs into the sand, then it fits.

PARAGRAPH 9

GQ: What did you do to..

Well, I went through and picked out the words that I didn't really understand or hadn't heard very often before, like "band" I hadn't heard it used that way before, and like rubber band sure, but not One
like bands of people like a group of people,

PL: Other ideas...

I don't think so.

P2: Why about the bands and not the first sentence?

Well, I hadn't heard it used that way before. And the many of the Bushmen's stories are about animal life..that really doesn't fit in with the second sentence or the rest of the paragraph. That's talking about stories, and then all of a sudden in the next sentence it's wandering across the whole desert.

P3: Normally do/didn't

No

P4: What need to be able ..

Just to make sure that they understood all of the words and understood how the sentences fit. Like for the first one, that doesn't really make a whole lot of sense in there. And they might think it's a big part of it or something.

P5: What change...

Probably cut out that first sentence. And....about the last one.

CP: Why

Well, thosettwo are related but they're not related to any other one in the whole paragraph.

Subject 3 - Poor Reader
Normal Text

PARAGRAPH 1

GQ: What did you do to...

Well, I read it over and over again. **Eight**

CP: How does that help you?

Well, then it get's into my mind and I remember it more.

P1: Which ideas did you...

When they were talking about dry lands. When they were talking about the most important parts.

CP: Can you show me which sentences...

Like the first one about the dry land, and the plants and the animals and the high temperature.

P2: Why those and note "Vegetation is scarce?"

Well, that might be one too, but...so you can..that's the most important because...they're going to be asking you about the temperatures and the vegetables...

P3: Should do/didn't do

No

P4: What advice

I'd tell them to read it over and get it into their mind, get the picture into their minds.

CP: What do you mean by the picture?

Like when they're talking about the stretch of dry land, think about a dry land.

P5: What change...

I'd just put in the most important parts.

P6: How easier?

Well, it'd be shorter for them and.....cause see when it's really long, you don't want to read the whole thing but when it's short you do.

PARAGRAPH 2

GQ: What did you do...

Well, I thought, and I just read it over and over again. I mean, you know, the important parts. And I thought to myself, that, well people would study more if they'd think that this wasn't a test... if they got in their mind that it was just for fun.

CP: Why do you think that?

Well, it's just the idea of taking a test. Well, some people, they don't want to take tests...

P1: Which ideas...

About when they mention..well they're talking about roots and trees.

CP: Can you point out the sentences

Well, about the 200-foot baobab tree is seen and the hot and dry climate...and the seeds, well the last sentence.

P2: Why those and not the first sentence?

Well, the first sentence, that doesn't look like it's an important one like the other ones do.

CP: What's different about the sentences?

Well, the first one, they don't tell how they're ruining the plants but the other ones do tell what's wrong with the plants and what's killing them.

P3: Anything normally do/didn't do?

No

P4: What advice?

I wouldn't have so much big words, so many big words in there.

CP: Can you give me an example of words you wouldn't have in there?

Like, that Kalary..or whatever that desert is..that's kind of hard to pronounce. And, germating...

CP: Would they really need to know how to pronounce Kalahari?

Well, yes, so they'd know what they're talking about.

CP: Could they figure out what germinate meant?

Well, they'd probably have a feeling of what it is because they're talking about roots and seeds.

CP: What do you think it means?

They can live.

P6: How would it make it easier by changing those word

Well, I'd,...the seeds cannot live without water.

CP: Why would that make it easier?

Because they'd know what they're talking about.

PARAGRAPH 3

GQ: How did you go about...

Well, I read it carefully and..... **Eleven**

P1: Which ideas...

When it mentioned rain

CP: Which sentences, can you show me?

Like the first one.

P2: Why that and not "Flowering plants add...

Because this one, the first sentence, it says the desert is without rain for almost ten months of the year and without that, without the rain they wouldn't have plants and seeds and stuff.

CP: How is reading carefully different from other kinds of reading?

Well, if you just zip right through it you ain't going to get anything out of it.

P3: Should do/didn't do?

No

P4: What advice?

Nothing...I think they'd understand it.

P5: What change?

Cut the sentences down.

CP: Which ones would you take out?

The grass turns green and the leaves and blossoms appear. They could just put the grass turns green. There's no leaves. Blossoms appear on bushes. They'd just put they're added....there's more "ands" in the sentence than there is words.

P6: How easier?

Well, it'd be shorter, but if they get right out to the point, you could understand it more better.

PARAGRAPH 4

GQ: How did you go about...

(silence)

P1: Which ideas did you...

Like when they, like they become slippery mud and caked with earth..the exciting ones, you know.

Ten

P2: Why that and not "In March, the drought or dry time....."

Well, this sounds...it probably doesn't have nothing to do with the sentence but it's...when I read it sounds more exciting, you know.

CP: What do you mean by exciting?

It has more action in there.

P3: Anything should/didn't?

No.

P4: What advice?

Well, read it all so they'd know what they're talking about and not skip one line.

P5: What change...

Nothing.

PARAGRAPH 5

GQ: How did you go about...

Well, it is, I thought it was better to understand because it talked about...like the second...third sentence, "As adults they are 4½...it's...well people like to hear about funny things you know and this is kind of funny."

Ten

P2: Why that and not the last sentence?

Well, because they talk about people that were on the earth now.

P3: Anything normally do/didn't?

No

P4: What need to be able to do...

Something they should do? (yes)

I don't have any idea

P5: What change?

Nothing

PARAGRAPH 6

GQ: What did you do...

Well,.....it was interesting

CP: What was interesting about it?

Well, not really interesting, but it had like a lot of words in there that I'd understand.

P1: Which ideas...

None

P2: Anything you didn't pay attention to?

I don't think so.

P3: Should do/didn't do

I should have slowed down because I zipped right through it.

CP: How does slowing down help?

Then you can understand it more better.

P4: What advice?

Well, this one I'd tell them not to zip right through it because if you did zip right through it you wouldn't know what it was talking about.

P5: What change?

There's probably some words they wouldn't understand.

CP: Which words?

Like conditions and migrate and Bushmen

CP: Why conditions and Bushmen?

Well, they're..conditions and Bushmen?

CP: Well, I'd put it as a little word..Not a great big one.

CP: What about Bushmen?

I don't even know what a Bushman is.

CP: What about migrate?

Well, that means move...I'd just put move

CP: Is there anyway a younger student could figure it out?

They'd just have to look, from place to place and put the words together. They'd look at the whole surrounding of migrate.

PARAGRAPH 7

GQ: What did you do to...

Well, I concentrate on my mind, that..to memorize what the words **Eleven** were and think how they're done.

CP: How what are done?

How the, like, they're talking about the grass and that and about the eggshells and the winds..just how they're.... printed in the sentence. You'd think..you know, remember what that is.

CP: When you say you'd memorize, what do you do to memorize something?

Well, you get it in your head.

CP: How do you do that?

Well, you just think about it for awhile and then it would go in.

P1: Which ideas...

None

P3: Anything should/didn't?

No

P4: What would they need to be...

They'd probably get mixed up on some of the words.

COP: Can you give me an example?

Like the "Bushmen live in these skerms." They'd probably get mixed up on that word, the zigzags and stuff.

CP: Why would they get mixed up on zigzags?

Well, they probably wouldn't know what they were talking about.

CP: What would you do help them?

I'd tell them what that word meant.

CP: What about skerms?

I'd give them the meaning of it.

P5: Why would those things help them?

Well, they'd know so like the Bushmen lived in their houses, you could say, which gave them shade. They wouldn't have to sit there and say what do you mean?

PARAGRAPH 8

GQ: How did you go about trying...

Well, it was long so I put my mind to it... I put out everything in the room and I just concentrated on that. Eleven

P1: Which ideas..

Nothing.

P2: Any ideas you didn't pay attention to?

No

P3: Normally do/didn't?

No

P4: What advice...

To tell them to put everything out of their mind and to concentrate...before they even read they might make up their mind that they're going to pay attention to it or not, otherwise, they ain't going to do so good.

P5: What change...

I wouldn't do nothing.

PARAGRAPH 9

GQ: How did you go about...

I just concentrated on it.

Eleven

P1: Which ideas?

Well, the big words like territory and permission..to get them in my mind to know what they are.

P2: Why those and not the last sentence?

Well, they didn't have as many words in there...See I pay attention to the words that don't look familiar so then I can get more of the meaning to the sentence.

P3: Anything should/didn't?

No.

P4: What advice?

Well, there's a lot of difficult words in here. I'd give them the meaning of the words.

CP: Why would that help?

So they'd know what they're talking about.

P5: How change?

I'd just leave it.

CP: Even with the hard words?

I probably wouldn't put like territory in there. I'd probably put land and permission, I'd put ask or something.

Subject 4 - Good Reader
Disrupted Text

PARAGRAPH 1

QQ: What did you do?

Well, like I read over it once really quickly and then the stuff that you know you just take for granted, I mean like the stuff about the vegetation you know about for every desert, and so that's going to be the same. But then the stuff like it's in southwestern Africa and covered three nations, and then the Kalahari desert, you want to make sure and remember that because that's the title

Two

P3: Anything should do/didn't?

Maybe just take down all the details instead of just the one's....

P4: What would a younger student need to be able to

Well, probably he'd have to go a lot slower that way. If...he probably wouldn't even preview it. He'd just read it over the first time and then maybe just...maybe stop and figure out what's most important.

CP: How could he figure out what's most important?

Well, he'd look at the title first thing. And probably the whole thing he'd probably pay attention to instead of like I just skipped over the vegetation and stuff but well he might not know that.

CP: How does previewing help?

Well, I read it super fast and then, you just pick up things. And then, like, the vegetation you just skim over that the second time when you're trying to find details.

P5: What change...

Well, the sentences are OK because they're pretty short except for the third one or fourth one, that's pretty long.

You might adapt the words, they're pretty long.

CP: Can you give me an example?

Like, adapted, ... the rest of them are I guess OK, vegetation maybe.

CP: How change...

Vegetation, like the plant life. And adapted, you could just spell it out, like they changed their needs.

P6: How easier?

Like what you could to is use the plant life somewhere and then farther down use vegetation instead. That way...like they don't know but they're finding out a new word because it's used in the same place.

PARAGRAPH 2

GQ: What did you do...

Well, I previewed. And then there was a lot of stuff that was important so I went over it and I changed it into three basic ideas.

Three

P1: What were they...

There aren't very many really big plants, most of them are just dry grasses and stuff. Then there's the baobab tree and there's a lot of stuff about that. Then they're talking about how the seeds....seeds didn't even grow at times they just waited until the rain came cause you had to have rain.

P2: Why those ideas and not the first sentence?

Well, the first sentence is said in the first paragraph before.

P3: Should do/didn't do?

Well, if you're reading this form information, like, for a report or something, you should maybe take down notes or something.

CP: How do notes help you?

Well, like you might do that the plants, you might write

down plants, the grasses and bushes, and then you write down the baobab tree and then a couple of details ...Just the three main parts and then the details.

CP: How did you know to divide it into three parts?

Well, I read it through and then I just noticed that there were three basic things that were talked about.

P4: What need to be able to do...

Well, some of the...they might take the three ideas and put them in separate paragraphs.

CP: How help?

Well, like some of the, having the seeds can't germinate without water; it doesn't have too much have to do with the sags and folds of the baobab tree.

P5: What change....

Well, the words were OK this time. You might want to be a little bit more imaginative, like use more words like spongy.

P6: How help?

Well, you can relate it to different things and it's not just so, like thick branches, you could say, enormous to make them seem more alive.

PARAGRAPH 3

GQ: How did you go about...

Well, basically the same way although I didn't preview this one. This one was just all basically the same idea...there's two maybe... but it's basically the same thing.

P1: Which ideas....

How when the rain does come then...life becomes really active and lot of things happen..

P2: Why those ideas and not "These plants bud, blossom....."

Well, that's going to happen naturally if the season is short. *Four*

P3: Normally do/didn't

Well, like I'd take down the December, January, February... but I'd just remember that it doesn't rain most of the time.

CP: By take down, what do you mean?

I'd note in my mind or keep a good record...either that or write it down.

P4: What need to do....

Well, he might break it down into three or four different groups, like putting the animals in one, what the plants do in one, and how the plants brighten up and how they become active and about the ponds and maybe even about the rain.

Like I see the whole thing contained in two sentences

CP: So for a younger student?

He should break it down into three groups.

CP: How would he know how to do that?

Well, you just naturally break it down because it's talking about different ideas, so you'd want to take down all those different things.

P5: What change...

Add better words. You might want to say..since it was 13 months...that those three and 10...you'd want to separate that...break it down and say like the middle of December of something. Otherwise, he might get confused on that. What do you mean by holes in the ground there? There aren't too many holes in the desert, unless it's an Arab well or something...

P6: How better?

Well, like it makes more specific ideas. Like if you were talking about the Arab well and then how that fills up... and add in examples, especially like with the plants and stuff.

CP: How do examples help?

They demonstrate the ideas in a basic idea.

PARAGRAPH 4

GQ: How did you go about...

Well, it's, kind of like a continuing thing that in March this happens, and then slowly they just dry up from March to August.

P1: Which ideas not pay attention to...

The ideas, cause I figured...I could tell from March to August..I knew it was going to dry up eventually. And the rest is just details and stuff. And the rest I knew.

P3: Should do/didn't?

Well, pay attention to the details..and how, like, you might want to settle down on the ideas about how far apart the waterholes are going to be.

P4: What advise...

It depends upon how much he knows. Cause if he doesn't know hardly anything at all, he should pay attention to a lot of details so you could learn the stuff. But like if he was in fourth grade, he'd skip a little of the information, but not all of it.

P5: What change...

Well, use examples of how the desert...you might want to put in something about oasis's.

CP: Use examples of how the desert what?

Oh, how the desert..it's really hard to get from place to place if you don't leave in the middle of January or something.

P6: How better?

It provides and example you can relate to.

PARAGRAPH 5

GQ: What did you do...

It was all one idea about the Bushmen and how, why and how they Two
where they do.

CP: How did you figure that out?

They didn't state it exactly right out and the topic sentence isn't a really very good one because it doesn't say anything.

CP: What's a topic sentence?

It gather's the whole information, in the whole paragraph, and like you should have a topic sentence like at the end of the paragraph too. And maybe at the beginning, but it should have one at the end.

P1: Any ideas didn't pay attention to?

Not really.

P3: Normally do/didn't do

No

P4: What need to be able...

Well, they might have to know about a little bit of measurement. Like if they're only 4 1/2 feet tall, then they might say they're pretty tall. You should have something to compare the 4 1/2 feet to.

CP: What could you do to help them do that...

Well, as an adult, like, you could like find a figure of an average third graders height and just say that's about how tall they are as an adult.

P5: What change?

Put in more details about the war because...and you could say how crude the weapons they used were..and just go how these people are real primitive beings.

CP: How did you know they were real primitive?

Well, they live in the desert and they still hunt and gather they don't live in cities and they didn't have mass transportation to run to the other side of the desert.

P6: How would putting in more details make it easier...

Well, when you're just talking about the war, then that doesn't really say very much, just that there was a war. But if you put in like more details, you could put in a lot of information about the Bushmen too and how when they fought they didn't have swords and stuff. And so that might let them understand that when they went to live where they do now they aren't going to have cars and buses all of a sudden.

PARAGRAPH 6

GQ: What did you ...

I looked at the topic sentence and that's kind of spread all over the place. Well, in the first part you're talking about the animals and then you're talking about how they moved, and at the end they're called nomads. And that doesn't have anything to do with anything else except for the moving.

Two

CP: What do you mean by the topic sentence being spread out?

Well, they don't...well it just doesn't really have one because they're talking about how they well, you might put together one some place. Like, "Because the animals move and the waterholes dry up..then the people have to move around." But it doesn't say that anywhere.

P1: Which ideas did you pay particular...

Well, it would have helped if there was a topic sentence.

P2: Any didn't pay attention to...

{ The part about nomads. I know exactly what nomads do and how they move around and because of all the stuff in the paragraphs, you know 1-5, then the other stuff, those are all the reasons for this.

Four

P3: Anything normally do/didn't

No.

P4: What need to be able...

Well, like, you have to know a little bit about why they have to move and be able to put together ideas, because like this and this means that they have to move.

CP: What do you mean this and this?

Like because they have to hunt and because of the water-holes get dry, the people must move.

Without a topic sentence they'd have to figure that out themselves.

P5: What change...

Well, where it says, such people are called nomads at the end you shouldn't say such people. You should say like, "The Bushmen of the upper KD are called nomads because.." then put that paragraph.

And the fifth one, the end of that. Where it says that the people then became hunting and gathering people, then that goes along with this a lot more than it goes along with the war.

CP: Could they figure out what a nomad was even if you didn't change it?

Yeah, because it says, it describes a nomad. Like if you put the "Such people are called nomads" because they move from place to place it would be clearer.

PARAGRAPH 7

GQ: What did you do...

Well, again, there isn't really very much of a topic sentence, because there are about three different ideas.

Three

P1: What are they?

They set up a camp, then their houses, and then why the eggshells are important.

CP: How did you know to pay attention to those..

Because that sentence and a couple of sentences that followed it were..

CP: What do you mean that sentence?

The sentence that introduced that idea, like "The bushmen set up a werf, which is their word for camp." That introduces all this stuff about the camp.

P3: Anything should do, didn't do

Well, if like you were doing vocabulary, there's words that would be important, like skerms and werf.

CP: Why would those be important words?

Well, because that's what they call, their name for a house and the town.

P4: What advice?

When you find a word you don't know, such as like skerm, which is stuck in there all of a sudden because it doesn't say a skerm is the name for house, it's just a skerm.

CP: What should they do if they see that?

Like if its, a big word, not like skerms, or something that wouldn't be found in the dictionary, you should look that up and try to figure out what those mean. If you can't figure it out by just looking at the sentences around it.

CP: Could they do that in this one?

Yeah, probably.

P5: What change...

The stuff about the eggshells being really important. That makes them sound like they are super, super important. But, the eggshells really aren't important...well, like are, in so much as they contain the water, but they make them sound like that they're placed in an important pattern just because they hold water and that's why..which doesn't make too much sense.

CP: So what would you do...

Cut out the stuff about the carefully placed row of ostrich eggshells, because that makes it sounds like just because they're eggshells, they're put in this special design.

PARAGRAPH 8

GQ: What did you do to...

Well, this one was pretty easy because the topic sentence is right in the front.

Two

CP: What is a topic sentence, you keep talking about them?

Well, it's something that tells what the whole paragraph is going to be about or was about.

P2: How did you know the first sentence was the TS of this paragraph and not "The Bushman works hard"

Well, they work hard, you're going to have to work hard because it's in the middle of the desert and to get this necessity for survival. Now "this necessity" doesn't specifically say anything more. The main task..they stated it right out.

Pla: Any others you paid particular...

Well, I knew the stuff about them having to dig down in the sand and stuff, but like how they would look where nobody else would think to look.

CP: Why?

Well, because, well the Bushmen, well they probably know the area a whole lot better than any traveler. And a traveler would be feeling really sorry for himself, going oh, I'm thirsty, I'm thirsty....And there might be a big, huge puply bush in front of him and he might look at it, oh, nice bush and crawl on by.

P3: Normally do/didn't.

No

P4: What need to be able...

Well, they'd have to have a pretty good vocabulary.

CP: Why?

Well, like, to understand things and to define words like the ostrich, necessity, and what these words do mean.

CP: Just because you could pronounce the words would that mean you'd understand it?

Well, that might help a little, because like if you didn't know what it was, and then like, sometimes you see a word and you don't know what it is, and then when you find out how it's pronounced, then you find out you do know that word. But you might want to put in some more details about them, like, is it green or purple or something, then somebody else might try...go away from it because it looks poisonous or something.

PARAGRAPH 2

GQ: How did you go about..

Well, there wasn't really a topic sentence, but the first sentence introduced the first idea, and that wasn't...there isn't any details to support that sentence at all. That's just the only thing in the whole paragraph. The rest is just about how they lived together and how they defended the property and stuff.

Two

P3: Anything normally do, didn't

Well, it depends upon what you're reading it for, just for the pleasure of it or to take notes...you'd probably go a lot slower and you might go back over the things that you found were important and try to memorize them and go together.

CP: What do you mean by memorize?

Well, I don't ever have that problem. I can read over something and then all of a sudden the whole thing about sticks in my mind.

Like if you're going to say it right away, you might want to go over the things you found right at the beginning and just read over them again.

P4: What need to be able...

Well, he might want some reasons why they don't ever go on another person's territory cause like we might move from state to state and nobody's going to care.

P5: What change..

Well, you might want to add something about what happens if a band sets up a werf in somebody elses' territory. And you use territory an awful lot, why don't you use some other words.

And since this is getting to the end of the story, put in words that you learned earlier, like they do in first grade readers.

P6: How easier?

Well, it wouldn't make it easier, but it would like..if you didn't catch the meaning of werf before, you might catch the meaning now.

APPENDIX H

ANALYSIS OF COVARIANCE OF GOOD AND POOR READERS' STRATEGY
RESPONSES ADJUSTING FOR VERBAL FLUENCY

TABLE 15.1

ANALYSIS OF COVARIANCE OF GOOD AND POOR READERS' STRATEGY
RESPONSES IN CATEGORY ONE ADJUSTING FOR VERBAL FLUENCY

Source	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>Significance</u>
Verbal Fluency	19.743	1	19.743	6.149	.017*
Between	11.783	1	11.783	3.670	.062
Within	131.656	41	3.211		
Total	163.182	43	3.795		

	Good Readers	Poor Readers
Observed Means:	3.59	2.14
Covariate Adjusted Means	4.14	1.58

* $p < .05$

TABLE 15.2

ANALYSIS OF COVARIANCE OF GOOD AND POOR READERS' STRATEGY
RESPONSES IN CATEGORY TWO ADJUSTING FOR VERBAL FLUENCY

Source	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>Significance</u>
Verbal Fluency	89.258	1	89.258	23.917	.004*
Between	12.706	1	12.706	3.405	.072
Within	153.014	41	3.732		
Total	254.977	43	5.930		

	Good Readers	Poor Readers
Observed Means:	3.50	1.45
Covariate Adjusted Means	4.08	.87

* $p < .05$

TABLE 15.3

ANALYSIS OF COVARIANCE OF GOOD AND POOR READERS' STRATEGY
RESPONSES IN CATEGORY THREE ADJUSTING FOR VERBAL FLUENCY

Source	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>Significance</u>
Verbal Fluency	21.461	1	21.461	10.639	.002*
Between	3.018	1	3.018	1.496	.228
Within	82.703	41	2.017		
Total	107.182	43	2.493		

	Good Readers	Poor Readers
Observed Means:	2.36	1.36
Covariate Adjusted Means	2.64	1.08

* $p < .05$

TABLE 15.4

ANALYSIS OF COVARIANCE OF GOOD AND POOR READERS' STRATEGY
RESPONSES IN CATEGORY FOUR ADJUSTING FOR VERBAL FLUENCY

Source	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>Significance</u>
Verbal Fluency	164.785	1	164.785	27.884	.000*
Between	.080	1	.080	.013	.908
Within	242.295	41	5.910		
Total	407.159	43	9.469		

	Good Readers	Poor Readers
Observed Means:	3.95	2.45
Covariate Adjusted Means	4.0	2.40

* $p < .05$

TABLE 15.5

ANALYSIS OF COVARIANCE OF GOOD AND POOR READERS' STRATEGY
RESPONSES IN CATEGORY FIVE ADJUSTING FOR VERBAL FLUENCY

Source	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>Significance</u>
Verbal Fluency	5.332	1	5.332	7.015	.011*
Between	.300	1	.300	.394	.534
Within	31.164	41	.760		
Total	36.795	43	.856		

	Good Readers	Poor Readers
Observed Means:	1.14	.73
Covariate Adjusted Means	1.23	.64

* $p < .05$

TABLE 15.6

ANALYSIS OF COVARIANCE OF GOOD AND POOR READERS' STRATEGY
RESPONSES IN CATEGORY SIX ADJUSTING FOR VERBAL FLUENCY

Source	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>Significance</u>
Verbal Fluency	5.619	1	5.619	1.571	.217
Between	5.317	1	5.317	1.487	.230
Within	146.610	41	3.576		
Total	157.545	43	3.664		

	Good Readers	Poor Readers
Observed Means:	2.14	1.23
Covariate Adjusted Means	2.51	.86

TABLE 15.7

ANALYSIS OF COVARIANCE OF GOOD AND POOR READERS' STRATEGY
RESPONSES IN CATEGORY SEVEN ADJUSTING FOR VERBAL FLUENCY

Source	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>Significance</u>
Verbal Fluency	3.588	1	3.588	.609	.440
Between	9.873	1	9.873	1.675	.203
Within	241.721	41	5.896		
Total	255.182	43	5.934		

	Good Readers	Poor Readers
Observed Means:	2.68	1.59
Covariate Adjusted Means	3.19	1.08

TABLE 15.8

ANALYSIS OF COVARIANCE OF GOOD AND POOR READERS' STRATEGY
RESPONSES IN CATEGORY EIGHT ADJUSTING FOR VERBAL FLUENCY

Source	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>Significance</u>
Verbal Fluency	1.381	1	1.381	.451	.506
Between	9.621	1	9.621	3.142	.084
Within	125.543	41	3.062		
Total	136.545	43	3.175		

	Good Readers	Poor Readers
Observed Means:	0.68	1.68
Covariate Adjusted Means	0.18	2.18

TABLE 15.9

ANALYSIS OF COVARIANCE OF GOOD AND POOR READERS' STRATEGY
RESPONSES IN CATEGORY NINE ADJUSTING FOR VERBAL FLUENCY

Source	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>Significance</u>
Verbal Fluency	6.411	1	6.411	7.419	.009*
Between	6.042	1	6.042	6.991	.012*
Within	35.433	41	.864		
Total	47.886	43	1.114		

	Good Readers	Poor Readers
Observed Means:	.45	.86
Covariate Adjusted Means	.05	1.26

* $p < .05$

TABLE 15.10

ANALYSIS OF COVARIANCE OF GOOD AND POOR READERS' STRATEGY
RESPONSES IN CATEGORY TEN ADJUSTING FOR VERBAL FLUENCY

Source	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>Significance</u>
Verbal Fluency	7.763	1	7.763	1.599	.213
Between	.001	1	.001	.000	.987
Within	199.031	41	4.854		
Total	206.795	43	4.809		

	Good Readers	Poor Readers
Observed Means:	1.59	1.27
Covariate Adjusted Means	1.60	1.26

TABLE 15.11

ANALYSIS OF COVARIANCE OF GOOD AND POOR READERS
RESPONSES IN CATEGORY ELEVEN ADJUSTING FOR VERBAL FLUENCY

Source	<u>SS</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>Significance</u>
Verbal Fluency	20.511	1	20.511	6.438	.015*
Between	4.420	1	4.420	1.387	.246
Within	130.615	41	3.186		
Total	155.545	43	3.617		

	Good Readers	Poor Readers
Observed Means:	.77	1.86
Covariate Adjusted Means	.43	2.20

* $p < .05$